RESPONDING TO THE CRISIS IN INFORMATION TECHNOLOGY SKILLS

A REPORT TO THE SECRETARY OF THE TREASURY

Chief Information Officer
Office of Information Technology Policy and Management
Information Technology Workforce Improvement Program

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EXECUTIVE SUMMARY

The nation and the world are becoming increasingly dependent on information technology. In the Treasury Department we are modernizing the bureaus' information systems, convening Internet-based international efforts to track and combat financial crimes, selling coin sets, uncut currency and savings bonds over the Internet, and overhauling our wireless law enforcement communications systems. The scope and breadth of our ongoing programs are extraordinary. Undertaking such efforts requires a highly skilled workforce.

To continue to offer citizens top quality service and to take advantage of advances in technology and the increasing ubiquity of the Internet, we recommend that the Department: 1) develop the best IT leadership in government; 2) enhance the IT skills of non-IT program managers so that they can be full partners in IT decision-making; 3) improve IT management training for technical staff and develop the leaders of the future; 4) define the key competencies needed by technical employees and assist them in developing the skills that they need; and 5) develop workforce strategies and plans which improve the attractiveness of the Department as a place to work and learn and thereby enhance recruitment and retention of our key personnel. This report outlines how these objectives can be achieved.

Clinger-Cohen Act Requirement

The Information Technology Reform Act of 1996 (later named the Clinger-Cohen Act) establishes chief information officers in each of the 28 major agencies, including the Treasury Department. Section 5125(c)(3) of the Act specifically requires the CIO to provide an annual report to the head of the agency. The report must assess the IT knowledge and skill needs of the agency, identify areas where improvement is needed and identify strategies for improvement.

In carrying out this legislative mandate, we have become increasingly aware of the highly competitive and challenging environment within which we must perform our mission. Treasury must compete in the employment marketplace with all other private and public sector employers to attract and retain IT talent.

The National IT Workforce Shortage

At its annual international conference in October 1998, the Society for Information Management issued a position paper entitled "IT Workforce Shortage." A major finding from this study was that over 80% of top IT executives surveyed agreed or strongly agreed with the statement: "The IT workforce shortage is the most severe in the 50-year history of computing." Other studies have confirmed this conclusion.

The IT skills shortage is real. It is global. And, it is likely to become chronic. For the Department to effectively acquire needed IT skills, it must place a significant emphasis on identifying and developing talent and optimizing the skills of the IT personnel that it now employs.

Treasury Department Responses to the Challenge

Shortly after the passage of the Clinger-Cohen Act, the Department began an effort to define the scope of the new CIO responsibilities for Department IT skills improvement. The Department began active participation in the Federal CIO Council Education and Training Committee and established an IT Skills Enhancement Subcommittee to the Treasury Department CIO Council (top technology officers of the Treasury bureaus). A small IT Workforce Improvement Program office was established in the Treasury CIO's organization.

In January 1998, the IT Workforce Improvement Program office and the IT Skills Enhancement Subcommittee undertook a comprehensive look at the Treasury IT workforce. Opportunities for improvement were identified and actions were immediately taken. Major accomplishments during CY 1998 included:

- A formal assessment of top IT management was undertaken and completed.

- A "Technology Track" was established at the Treasury Executive Institute.

- IRS's outstanding Project Management training program was broadened in scope and depth and offered to the entire Department, resulting in a major price discount.

- The Deputy Assistant Secretaries for Information Systems and Human Resources jointly issued a communiqué encouraging IT and HR staffs Department-wide to recognize the challenges of recruiting and retaining top-flight IT talent and promised to help managers remove hurdles they might encounter.

- A partnership agreement was signed by the CIO and the IRS to establish a Treasury School of Information Technology.

Developing the Best IT Leadership in Government

The top IT leadership of the Treasury Department controls substantial resources: total IT expenditures for FY 1999 will be $2 billion; 9,300 IT employees work in the Department; and the Department pays over $570 million annually for IT contract service support. IT spending in the Department is approximately 16% of the Department's total operating budget; this contrasts with many private sector companies where the goal is to keep IT spending at 1% or less of total spending. These staffing and funding commitments reflect the degree to which the Department is in the information business and is dependent on reliable and effective information systems to accomplish its mission. It is with this perspective in mind that the first group identified for formal assessment was the senior IT management of the Department.

On March 12, 1998, the Treasury CIO Council adopted a broad statement of the competencies needed by bureau and Department CIOs. Dougherty & Associates, Inc., a research contractor, was hired to build an assessment instrument, conduct the assessment and analyze the results. The assessment took place through an Internet-enabled survey from October 1-21, 1998. The final report was approved December 14, 1998. The final survey achieved a 77% response rate.

The major findings of this survey were:

- There was broad consensus on the importance and frequency of use of the major competency areas at which top IT executives should excel.

- Senior IT managers in the Department seem to have a proper scope of policy and delivery responsibilities, but they need to be given more opportunities to be involved in IT financial investment decision-making.

- Senior IT managers have a broad range of skills. There are not obvious Department-wide strategies for improving their development; tailored development seems most appropriate. Top IT executives are highly motivated to improve their skills and are willing to invest their personal time in relevant opportunities provided by the Department.

- Forty-five percent of senior IT management in the Department will be eligible for optional retirement within the next five years. The identified executive IT competencies need to be used in the selection and development of their successors.

Enhancing the IT Skills of Non-IT Program Managers

With the Clinger-Cohen focus of program participation in IT strategy, planning and funding decisions, it is even more critical that IT and non IT program managers form a working partnership based upon genuine understanding and cooperation. Teamwork is a two-way street and it is necessary for non IT executives to develop their own IT competencies to an appropriate level. It is important to get a better understanding of the IT knowledge and skill level needed by program executives before launching into a program of skill development. We recommend that we establish the appropriate baseline level of IT knowledge and experience for non IT executives and integrate this into general Department executive development programs.

Improving IT Management Training to Develop Future Leaders

In our detailed interviews with Bureau CIO's and their top managers, two common threads emerged in management development discussions. These were: 1) preparing technical employees to take on the challenge of managing their peers; and 2) providing technical managers with the skills to be effective in managing projects which extend beyond technical parameters to a broader implementation and program performance framework.

Many technicians who enter management in IT organizations are not well equipped for a transition from technical to managerial work. As a result, they can be ineffective in these roles

and can reduce the performance of their work units. Two responses are appropriate to this situation. First, more attention needs to be given to how people are chosen for management. Outstanding technical employees need to be promoted along a separate career ladder and not moved into management as a way of providing them with deserved recognition and compensation. Changing this requires a review of Department and federal practices vis à vis career ladders and classification practices.

Second, more effort needs to be made to provide those chosen for management with the breadth of skills that they need. Focusing on entry level managers is likely to have significant long-term impact on Department IT management since these foundational supervisory skills are important at successive levels of management. We recommend the establishment of programs to meet these needs.

Concern about project management skills was another common theme that surfaced in our bureau CIO discussions. The days of IT projects being merely support or back room functions are gone. It is far more common now for IT projects to go to the heart of how services are delivered and decisions are made. We recommend that the bureaus make aggressive efforts to take advantage of comprehensive project management training programs.

Defining Technical IT Competencies and Stimulating Development

In general, the Treasury Department is not investing adequately in its technical workforce. The most frequently used measures are training dollars per employee and training dollars as a percent of payroll. Using conservative assumptions, we estimate that the Department is devoting approximately 1.5% of its IT payroll to the development of its IT staff. Over the preceding three years, this spending was less than 1% of payroll. This contrasts with national averages of 1-3% of payroll and world class technical organization averages of 8-10% of payroll. Individual bureaus have recently made large investments in training and some have more structured programs; however, investments have been episodic in a career field in which keeping current requires continuous lifelong learning and continual steady investment. We are proposing bureau investment targets and monitoring against these targets.

The solution to our learning deficit requires more than greater spending. There is unlikely to ever be enough money to meet all of our IT training needs. We need to make sure that money allocated for staff development is spent in a balanced way and that it addresses specific competencies that are critical to job performance. The Internal Revenue Service has developed a baseline model that identifies specific competencies that are critical to IT job performance. We propose that Treasury encourage the Federal CIO Council to work with the Office of Personnel Management (OPM) to refine and simplify the IRS model so that developmental expenditures across government can be more targeted and more cost-effective.

The Department is not putting enough emphasis on career development and formal training. Only approximately 13% of its technical staff have IT-related college degrees and only about 40% have college (30%) or graduate (10%) degrees. This is lower than the general Treasury workforce

(over 55% college or above). This contrasts highly unfavorably with the private sector where 82% of companies indicated that a college degree was a minimum requirement for technical professional staff. We recommend the Department explore the feasibility of supporting degree related training for IT professionals and mangers and we support government-wide efforts to remove restrictions on government payment for technical certifications. These approaches have been used in the private sector as proven techniques for recruitment and retention and could have similar effects in the federal government. Employees we are training are doing a better job as a result of their increased knowledge. They also bring new ideas and concepts to the workplace.

Developing Workforce Strategies Focused on Recruitment and Retention

Our current IT workforce is mature and experienced. This puts the Department in a strong position to maintain its legacy systems and respond to the critical Year 2000 conversions. However, today's blessing is tomorrow's challenge.

The average age of Treasury technical employees is 44. There are more technical employees over 55 years of age than there are under 30. Since 1993, the only categories of technical workers that have shown a net increase are those workers ages 45 and over. Resignation rates are highest among the youngest workers. In recent years, technical employees who have been hired are older, on average, than those who have left the Department.

Although Treasury's technical workforce has been relatively stable (6-9% turnover vs. 10-30% turnover in many private sector companies), this may change dramatically in the next few years as large segments of the workforce become eligible for retirement. By 2004, 22% of current IT employees will be eligible for immediate retirement and another 27% will be eligible for discontinued service retirement. Holding onto these workers and attracting new workers in a tight IT labor market will be a significant challenge. We recommend that the Department take actions to promote itself as a desirable and challenging place to work and that it establish recruitment and retention programs aimed at attracting top IT talent.

Conclusion

The Treasury Department is approaching a crisis in information technology skills. Like the Year 2000 challenge, this crisis is belied by the seeming tranquility and stability of the day-to-day performance of the current workforce. However, this is a highly experienced workforce which is moving in great numbers toward retirement eligibility. It is also a workforce which must be continuously retrained to take on new technologies and new challenges. A coordinated and comprehensive effort must be undertaken now. Recruitment, retention and development programs must focus on the increasingly integrated roles of IT and core business functions. A talented and committed core of IT professionals is critical to the success of the Department.

Within 90 days, the Information Technology Workforce Improvement Program will develop a comprehensive plan of action to prioritize and implement recommendations in this report. This plan of action will include the development of a comprehensive budget and staffing plan jointly approved by the Treasury Chief Information Officer and Human Resources Advisory councils.

SUMMARY OF RECOMMENDATIONS

Recommendation 4-1: Current Treasury senior IT management should use the Treasury CIO competencies to: 1) form the basis for an ongoing assessment of their skills; and 2) build an individualized development plan to improve their skills. (Page 37)

Recommendation 4-2: The Department should use the Treasury CIO core competencies as a basis for: 1) establishing more uniform announcement and selection criteria for top Department IT positions; 2) establishing more formal development programs for IT managers which provide them with better insight into investment and IT policy decision-making; 3) emphasizing interaction and teamwork between program and IT executives; and 4) integrate longer term, more comprehensive and more broadly based development programs into the development of IT leaders. (Page 39)

Recommendation 5-1: Coordinate with the Deputy Assistant Secretary, Human Resources to better determine competency needs and skill levels in IT among non-IT program executives. Provide developmental opportunities geared to their needs. (Page 42)

Recommendation 6-1: Request that the Office of Personnel Management review the GS-334 (Computer Specialist) occupational series and update technical categories within this series. Request that the Department's Deputy Assistant Secretary for Human Resources and the Deputy Assistant Secretary for Information Systems/CIO work with Bureau Personnel Officers and Chief Information Officers to establish realistic, common and predictable career paths for outstanding technical employees with exceptional knowledge. (Page 44)

Recommendation 6-2: Coordinate with Department and commercial sources to develop a pilot training program for new technical managers. This program could be used both to establish a cadre of employees with management potential and to support the ongoing growth and development of current IT managers. (Page 46)

Recommendation 7-1: We recommend that the Department establish guidelines and targets to encourage the bureaus to invest more heavily in the development of their IT staff. Such targets could have as their goal a three year program to bring annual skills investment in IT staff up from 1% of IT staff payroll to a consistent 3% of IT staff payroll on a bureau-by-bureau and Department-wide basis. (Page 53)

Recommendation 7-2: The Department should explore the feasibility of declaring IT jobs shortage occupations. This would allow bureaus to offer degree-focused training to their IT technical and management personnel. (Page 54)

Recommendation 7-3: Support Federal CIO Council Education and Training Committee efforts to reduce barriers to the reimbursement of commercial IT certification costs. (Page 55)

Recommendation 7-4: We recommend that the Treasury CIO Council propose that the Federal CIO Council refine and simplify the IRS model so that IT developmental expenditures across government can be more targeted and more cost-effective. (Page 57)

Recommendation 7-5: We recommend more use of distance learning technologies that shorten the gap between knowledge acquisition and performance and reduce the cost of training delivery. Technical support needs to be provided by the Department and each of the bureaus so that satellite and Web-based training transmissions can be adequately received and used by employees in every bureau. (Page 57)

Recommendation 8-1: Explore the feasibility of establishing a Department-wide program for temporary appointments or short-term recruitment to support critical vacancies. (Page 62)

Recommendation 8-2: Pilot an internal IT recruitment program which selects employees based upon their competencies and aptitudes. Establish programs to enable non-IT employees to make the transition to the IT career field. (Page 62)

Recommendation 8-3: Explore the possibility of raising recognition and understanding of Department missions by establishing long-term professional and recruitment relationships with universities and local high schools and their technology centers. Explore ways to use the Internet to promote the corporate Treasury identity and to demonstrate the variety of important and challenging efforts in which Treasury is engaged. (Page 63)

Recommendation 8-4: Review current employment advertisement strategies and develop more dynamic approaches so that Treasury IT job announcements are more targeted and better noticed by potential job applicants surfing the Internet for opportunities. (Page 64)

Recommendation 8-5: Create a Treasury Information Professionals Program aimed at attracting, rapidly developing and retaining recent college graduates. Manage this at a Departmental level and then reassign graduates to the bureaus of the Department. (Page 65)

Recommendation 8-6: Explore with OPM the possibility of providing agencies with the flexibility to pay retention bonuses based on a fixed term or project stage completion. (Page 67)

Recommendation 9-1: Based on the recommendations approved in this report, charge the Information Technology Workforce Improvement Program with the development of a comprehensive plan of action within 90 days. This plan of action will involve the development of a comprehensive budget and staffing plan and will be jointly approved by the Treasury Chief Information Officer and Human Resources Advisory Councils. (Page 72)

CHAPTER 1 – CLINGER-COHEN ACT REQUIREMENT

When Congress passed the Information Technology Reform Act of 1996 (Clinger-Cohen), it was seeking broad-based reform of the way that the Federal government manages technology. The purpose of this chapter is to outline the objectives of the Act, identify the specific workforce improvement components and describe the framework within which Treasury's IT Workforce Improvement Program has been operating.

1.1 Overview of the Clinger-Cohen Act

The Clinger-Cohen Act contains several major components. These are:

1) It repealed the "Brooks Act." This Act made the General Services Administration (GSA) the sole purchaser of computer hardware and software for the government and authorized the delegations program through which agencies requested authority to buy computer resources to meet their needs. The Clinger-Cohen Act allowed agencies to meet their needs without GSA authorization. It also simplified IT acquisition law and policy.

2) It moved GSA's oversight role in information systems management and acquisitions to the Office of Management and Budget.

3) It promoted improved efficiency and economy in management through the use of performance and results-based management and information technology capital planning and investment control.

4) It established chief information officers in 28 major agencies, including the Department of the Treasury. It established duties for these officers, including:

a) advising the head of the agency and other senior managers on IT acquisition and management;
b) developing and maintaining an integrated information technology architecture;
c) promoting efficient design and operation of information resources management processes; and
d) monitoring and managing programs to improve agency IT skills (detailed below).

1.2 Workforce Improvement Components of the Act

Section 5125(c)(3) of the Clinger-Cohen Act requires the CIO to provide an annual report to the head of the agency which addresses progress on the following mandate:

(3) annually, as part of the strategic planning and performance evaluation process required (subject to section

117 of title 31, United States Code) under section 306 of title 5, United States Code, and sections 1105(a)(29), 1115, 1116, 1117, and 9703 of title 31, United States Code–

(A) assess the requirements established for agency personnel regarding knowledge and skill in information resources management and the adequacy of such requirements for facilitating the achievement of the performance goals established for information resources management;

(B) assess the extent to which the positions and personnel at the executive level of the agency and the positions and personnel at management level of the agency below the executive level meet those requirements;

(C) in order to rectify any deficiency in meeting those requirements, develop strategies and specific plans for hiring, training, and professional development; and

(D) report to the head of the agency on the progress made in improving information resources management capability.

1.3 Federal Chief Information Officers (CIO) Council

Subsequent to the passage of this Act, Executive Order 13011, "Federal Information Technology", dated July 17, 1996, was issued. This Executive Order directed agency heads to support "...appropriate training of personnel." It also directed the Federal CIO Council to "...assess and address the hiring, training, classification, and professional development needs of the Federal Government with respect to information resources management."

The Federal CIO Council has attempted to fulfill this mission through the establishment of an Education and Training Committee. Treasury has been very active in this committee since its inception. The former Treasury CIO was the original chairman of this committee. Since the current Treasury CIO became Vice-Chairman of the Federal CIO Council, Treasury has been represented on the Education and Training Committee by a senior official and has continued to play a large role in its activities.

1.4 Federal CIO Council Education and Training Committee

The CIO Council's January 1998 Strategic Plan describes the function of the Education and Training Committee as follows:

"The CIO Council's Education and Training Committee has been charged with addressing the complex hiring, training, and development challenges of establishing and maintaining an effective Federal IT workforce. The Committee's approach to addressing these challenges includes identifying the IRM core competencies, leveraging existing training infrastructures such as the National Defense University, and distributing information on skill and training issues and opportunities widely through the Internet."

Treasury has been very active in several of the initiatives of the Federal CIO Education and Training Committee. In 1997, Treasury developed a strategy and alternatives memorandum which the Committee submitted to the Federal CIO Council. In 1998, Treasury served on the Education and Training Committee team responsible for reexamining the CIO core competencies. This competency statement was significantly updated and improved based upon Treasury's contribution. Treasury has also participated with GSA in developing learning objectives from the CIO core competencies to be used in the Education and Training Committee's "CIO University" project. This effort is aimed at ensuring that CIOs and senior government IT managers are properly prepared for the broadened scope of their jobs.

CHAPTER 2 – THE NATIONAL IT WORKFORCE SHORTAGE

While the Clinger-Cohen Act establishes a mandate to assess, improve and report on our progress in improving the IT skill level of agency personnel, it does not, in and of itself, identify this as a top priority for agencies. However, the dynamics of the job market for IT workers demonstrate that Treasury needs to address the challenges of recruiting, retaining and developing IT personnel if it is to be effective and successful. A number of recent private and public sector studies point to the critical nature of the IT workforce shortage. Treasury's own experience also points up the need to move now to establish programs and policies that will support a vital and resilient IT workforce into the next century.

2.1 Industry Studies

The most comprehensive studies of the IT workforce shortage have been done by the Information Technology Association of America (ITAA). Other local and national studies have affirmed ITAA's findings.

2.1.1 Information Technology Association of America (ITAA) Studies

The ITAA released a report in February 1997, entitled: "Help Wanted: The IT Workforce Gap at the Dawn of a New Century." The report was based on a random sample of 2,000 large and mid-size IT and non-IT companies. That study found that there were approximately 190,000 unfilled IT positions nationally and that "sixty-eight percent of IT companies contacted identified a lack of skilled/trained workers as a barrier to their companies' future ability to grow." It also found that 82% of large and mid-size IT companies planned to increase their IT hiring, further increasing the competition for these skills in the future.

Challenged on the rigor of its assessment, ITAA worked with Virginia Polytechnic Institute and State University to broaden the study and to increase its accuracy. A second report, "Help Wanted: A Call for Collaborative Action for the New Millennium," was issued in February 1998. In its introduction, the report set out three goals: 1) "obtain more detailed information on positions and vacancies;" 2) "improve the rigor of the methodology to increase the total number of responses from IT and non-IT industries;" and 3) "address selected issues and trends." It expanded the scope of the survey to 532 companies drawn from a universe of 104,000 companies. This study identified an estimated 606,000 unfilled jobs needing IT skills. Three hundred forty-six thousand of these jobs were in traditional IT categories such as programmers, systems analysts and computer scientists. The report also identified 19,000 IT vacancies in the Washington, DC, area (where 58% of all Treasury IT employees work).

2.1.2 Northern Virginia Partnership Study

A survey conducted by George Mason University for the Northern Virginia Partnership ("Good Skill Hunting," Washington Post, December 17, 1998) shows an even tighter labor market in the

Washington, DC, area. It estimated that there are between 20,500 and 25,500 unfilled IT positions in Northern Virginia alone.

2.1.3 Society for Information Management Survey

Other efforts to measure the IT workforce shortage confirm the scope of the challenge. At its annual international conference in October 1998, the Society for Information Management (an organization comprised of 2,700 senior executives who are corporate and divisional heads of IT organizations and leading academicians and consultants) issued a position paper entitled "IT Workforce Shortage." This paper was based upon an August 1998 survey of over 350 senior IT business leaders. These managers represent a span of control of over 150,000 IT workers and contract employees. The major finding from this study was that over 80% of those surveyed agreed or strongly agreed with the statement: "The IT workforce shortage is the most severe in the 50-year history of computing." The same 80% agreed with the statement: "The shortage is slowing the development and implementation of new systems."

2.2 U.S. Commerce Department Studies

The conclusions and concerns of industry trade associations and professional societies have been validated by Commerce Department analyses of the national workforce. The 1996 National Science and Technology Council publication, "Technology in the National Interest," demonstrates the pace of change that is confronting us. It reports that in 1984, 25% of workers used computers on the job; by 1993, 46% did. Even more sobering, it notes that by the year 2010, "60% of workers will need computer skills that only 22% of workers now possess." This rapid pace of technological change is putting a burden on IT professionals and on the general workforce.

2.2.1 America's New Deficit Report

In its September 29, 1997 report, "America's New Deficit: The Shortage of Information Technology Workers," the Commerce Department developed a more extensive analysis of the IT workforce shortage. It projected IT workforce needs through the Year 2005. It found that there will be approximately 1,000,000 new IT job openings and that new computer science graduates would be available to fill only about one quarter of these jobs. It also found that starting salaries for computer science graduates with Bachelor of Science degrees "have nudged up to an average of $36,666" while the federal government's entry level salary for computer professionals ranged from $18,700 to $23,200 for the same time period. Independent validation of Commerce's findings are available locally. The University of Virginia's McIntire School of Commerce reports that for the Class of 1998, the average starting salary for those holding the Master of Science in Management Information Systems degree from the school is $50,288 ("Job Market Strong for McIntire Grads," McIntire Exchange, October 1998).

Finally, the Commerce Study quotes Electronic Data Systems as reporting that IT worker compensation is growing 15-20% annually. It also references a Deloitte Touche Consulting Group international study involving 1,500 CIO's in 21 countries. That study found severe shortages in four key areas: client/server architecture; data modeling; distributed databases; and

packaged software applications such as SAP (PeopleSoft is an example of such a package and is the core of a Department-wide effort to modernize its human resources programs). Deloitte Touche found turnover rates in these areas of 35-45%.

2.2.2 GAO Comments and Concerns on Commerce Studies

In a letter (B-278899) to the ranking minority member of the House Commerce Committee, GAO assessed the "America's New Deficit" report and Commerce's conclusion that a shortage of IT workers exists in the United States. While GAO questioned Commerce and ITAA analyses and methods, it did not conclude that there was no shortage, only "that more needs to be known." GAO did agree with Commerce's judgment that the "demand for IT workers is expected to grow." In a March 17, 1998 letter responding to GAO's comments, Commerce's Director for Education and Employment Issues noted that: "...our report includes other evidence such as: discussions of companies' aggressive recruitment strategies, the offering of bonuses to employees who provide hiring leads, the offering of attractive signing bonuses, industry efforts to retrain staff, more extensive college recruiting, and early job offers of university students. Taken together, these industry practices are clear indications of a tight labor market for IT workers."

2.3 Treasury Experience

Because it has a mature and stable workforce, the Treasury Department has not yet encountered the severe shortage of IT skills that has surfaced in the private marketplace. Nonetheless, as it searches for new employees in hot skill areas or seeks to contract for IT services, it is experiencing the IT skills shortage first hand.

2.3.1 Hiring in Skill Shortage Areas

The Bureau of the Mint reports that it has had trouble hiring in a variety of skill shortage areas. While it has been able to find analysts and programmers (usually among federal status candidates), it has had difficulty finding a knowledgeable Oracle DBMS Administrator and a security officer with knowledge of the PeopleSoft environment. These skill shortages may inhibit the Mint's ability to move from a mainframe to a client/server environment.

The Year 2000 program upgrade has caused even legacy programming skills to become "hot skills." As an example, earlier this summer, IRS's Corporate Education group sought to hire instructors for its Assembly and COBOL language courses. Traditionally, eight such instructors would teach the nine week course for a total cost of approximately $157,000. This year, the price skyrocketed to $529,000 for the session. Attempts to validate this cost estimate brought prices as high as $720,000 for the same task.

2.3.2 Tight Entry Level Job Market

The Bureau of the Public Debt has generally been able to offer competitive salaries and a favorable cost-of-living environment to West Virginia computer science majors. Now, however, it reports that GS-7 Outstanding Scholar authority is not attractive to recent graduates. It indicates that less than a GS-9 will not attract this talent pool. Also, even recent graduates are coming to work without experience and skills in the most recent versions of software packages

such as PowerBuilder. Building and maintaining skills requires lifelong learning and a continual investment in training by Treasury's bureaus.

The U.S. Secret Service and several other bureaus expressed significant concerns about the time that it is taking to hire IT personnel. Because of the considerable security clearance work that must be done, potential candidates are taking other positions while under consideration for USSS positions. USSS indicated that it has had large numbers of respondents to its advertising, but few candidates are qualified and even fewer are willing to wait for the security clearance process to be completed before coming on board.

2.3.3 Rising Contractor Costs

The Automated Systems Division supporting the Departmental Offices indicated that when its support contracts were renegotiated in December 1997, it experienced nearly a 100% increase in the labor rates it had been paying for IT skills. Such increases are not unusual and may be an increasing issue as more skills are supported through contract assistance.

Another recent example of outsourcing was that undertaken by the Bureau of Alcohol, Tobacco and Firearms. It awarded a "Seat Management" contract to Unisys Corporation. This provides for Unisys to supply, support and provide training on office personal computer systems. Although this program has substantial benefits, including an improved quality of user support and training, improved responsiveness, improved technology and more predictable budgeting, prices are rising as a result of the higher cost of IT contract labor.

2.3.4 Losses to the Private Sector

In general, Treasury has not lost many employees to private sector employment. However, among young workers and those with specialized skills, attrition to the private sector is more of a problem. For instance, the Financial Crimes Enforcement Network (FinCEN) lost its senior network engineer to Gateway Computers and its CIO to PricewaterhouseCoopers.

The Comptroller of the Currency and the Office of Thrift Supervision (both of which have a higher pay scale than the General Schedule) indicate that they can attract talented employees in the Washington, DC, area. Many of these employees come to them from other federal agencies. However, the Comptroller indicated that it does lose job candidates and employees to the private sector because of the market for hot IT skills.

2.4 Summary

Industry, public and internal Treasury Department studies all document an increasingly tight labor market for IT skills. The IT skills shortage is real. It is global. And, it is likely to be chronic. For the Department to continue to perform its missions outstandingly, it must place a significant emphasis on identifying and developing talent and optimizing the skills of the IT personnel that it employs. Meeting the legislative mandate of the Clinger-Cohen Act, although important, is secondary to performing the missions and meeting the goals of the Department. Although the Treasury Department has not yet fully experienced the high turnover rates and tight skills market

that is challenging private companies, this challenge is fast approaching. We have a short time within which we can establish policies and strategies that will protect our ability to deliver technology-leveraged solutions to the public. An aggressive and timely response by the Department is needed.

CHAPTER 3 – TREASURY DEPARTMENT RESPONSES TO THE CHALLENGE

The Treasury Department has undertaken a cooperative and comprehensive response to the challenges of complying with Clinger-Cohen Act mandates. These efforts have had the full support of the Treasury Chief Information Officer, the Treasury CIO Council and the Deputy Assistant Secretary for Human Resources Management.

3.1 Establishment of the IT Workforce Improvement Program

3.1.1 Creation of the IT Skills Enhancement Subcommittee
On February 13, 1997, the Treasury CIO Council was briefed on the Department's obligations under the Clinger-Cohen Act. In response to this briefing, the Council chartered the IT Skills Enhancement Subcommittee. This group is jointly chaired by the Treasury Department's Program Manager for the Information Technology Workforce Improvement Program (ITWIP) and the IRS Dean of the School of Information Technology. The Committee met for the first time on March 25, 1997. The IT Skills Enhancement Subcommittee has representation from each bureau CIO in the Department. The Subcommitte's charter calls for it "to initiate the development and oversee the implementation of the strategies and plans (for Department IT knowledge and skills issues) that result in Treasury implementing guidelines, directives, procedures and policies necessary to comply with the (Clinger-Cohen) legislation."

3.1.2 Institutionalizing the IT Workforce Improvement Program
At a briefing for the Treasury CIO Council on February 24, 1998, the Information Technology Workforce Improvement Program was proposed. This program called for the completion of the work underway on the identification of Treasury IT senior management core competencies and the completion and publication of the IT professional development guidelines. It further outlined fact-finding and priority setting efforts that would be undertaken. On April 21, 1998, the Assistant Secretary for Management issued Treasury Directive 27-01 which approved a number of organizational changes, including the creation of a permanent position in the Office of Information Technology Policy and Management to lead the CIO's "professional development and competency management efforts."

3.2 Assessment of the Treasury Senior IT Management

The Clinger-Cohen Act emphasizes the need to improve the management of federal IT programs. Certainly, the top IT executives make the most significant and lasting decisions about IT technical direction and resources. It was in this context that the Treasury CIO Council determined that the initial focus of its IT workforce improvement effort should be on identifying and assessing the competencies of the Department's top IT officials.

On March 12, 1998, Treasury's CIO Council approved a framework for assessing themselves and

their senior subordinates. This effort began with a validation of the Federal CIO Council core competencies by the Maryland Consulting Associates (MCA) at the University of Maryland Business School. MCA surveyed bureau CIOs to obtain their input on the competencies. As a result of these interviews, MCA developed and the IT Skills Enhancement Subcommittee refined, a framework which represented a substantial improvement over the government-wide list of competencies. The revised competencies contain further definition and provide examples of performance. This framework provided a basis for assessing senior IT management. Over the Summer of 1998, the Council approved a self-assessment approach using the validated competencies and a third party evaluation of the assessment results. A contract was let to Dougherty Associates, Inc., and a Web-based questionnaire was developed. Dougherty presented its final report on December 14, 1998. This report constitutes the main basis for the findings in Chapter 4: "Developing the Best IT Leadership in Government."

3.3 Fact Finding and Priority Setting

Although the national IT workforce shortage is well documented, it was important to the Treasury CIO Council that Treasury have a good understanding of its own challenges with respect to IT skills. For this reason, substantial fact gathering operations were undertaken.

3.3.1 *Survey of CIO Priorities, Bureau Needs and Capabilities*

At the March 12, 1998, IT Workforce Improvement Program briefing, each CIO was asked to rank potential initiatives by their priority and by his or her interest in pursuing these initiatives. This provided the program with an initial measure of CIO interest so that the program could be focused on items deemed most important by top management. From March through June 1998, interviews and discussions were held with the 14 Treasury CIOs, their technical leadership and their HR support staffs. Based on these discussions, programs that would meet the most critical needs of the Department were identified.

3.3.2 Demographic Survey of Treasury Personnel

In order to get a better understanding of the Treasury IT workforce and the particular issues related to its make-up and dynamics, the IT Workforce Improvement Program requested an analysis of IT technical workforce demographics, including age, gender, length of service, education level, retirement eligibility, etc. The Treasury Integrated Management Information Systems (TIMIS) Office produced such an analysis on June 3, 1998.

Subsequent to this work, a team from within the IT Skills Enhancement Subcommittee conducted a more detailed look at accessions and separations within the Treasury IT community. It produced an analysis on July 16, 1998. Data from these statistical analyses have been used throughout this report and are drawn upon heavily in the analysis provided in Chapter 8: "Developing Workforce Strategies Focused on Recruitment and Retention."

3.4 Developing Cost-Effective Development Programs

The IT Workforce Improvement Program Office realized that there were major new responsibilities for IT executives that were effected by the Clinger-Cohen Act and that there

needed to be immediate action. A cooperative effort with Treasury Executive Institute (TEI) was begun. In addition, ITWIP identified resources throughout the Department that were being devoted to training and attempted to focus these more economically. Finally, based on input from Bureau CIOs, concerns about management development programs in project management and baseline management training were identified and addressed.

3.4.1 Establishment of a TEI Information Technology Track

Four TEI seminars and a development project were executed in the first year of this effort. All were 100% subscribed. They received strong positive feedback and achieved the program goals of appealing to technical and non technical executives and enhancing their IRM knowledge. Table 1 outlines these sessions:

Table 1 -- FY 1998 TEI Sessions

Title	Participants	Content
CyberTerrorism and Hard-Core Hacking April 28, 1998	Dr. Barry Collin, Senior Research Fellow at the Institute for Security and Intelligence	Provided a survey of potential information systems security vulnerabilities and highlighted best case practices undertaken by the U.S. Secret Service.
Technology Does the Strangest Things June 16, 1998	Elliot Masie, President The Masie Center	Survey of important technology trends including the Internet and the use of Collaborative Technology.
Let Me Try -- IT/Partnership Conference TEI Session July 22, 1998	Colonel Edward L. Hubbard Former Prisoner-of-War in North Vietnam.	IT/Partnerships Keynote Speaker took the broad personal empowerment and incremental improvement themes of his keynote address and applied them to management practices that could demonstrate leadership and bring out the best in leaders.
Managing the IT Portfolio -- Your Key to Success August 19, 1998	Mark Forman, IBM and former senior staff member on Senate committee responsible for Clinger-Cohen Act Also included best practices from IRS in data center consolidation planning.	Described the Clinger-Cohen provisions linked to the management and evaluation of IT investments. Highlighted best case examples from IBM IT capital planning and business transformation effort.

Based upon the first year success of the program and the positive response from IT and non-IT executives, the Treasury Career Advisory Panel (TCAP) has endorsed the expansion of this program for FY1999. An additional four sessions will be scheduled in FY 1999 (topics currently planned include IT Architecture and Electronic Commerce). Also, TEI is working with the IT Workforce Improvement Program to identify appropriate sessions that would support non IT executives. Significant feedback from these executives indicated their desire for such programs.

3.4.2 Establishment of Professional Development Guidelines

Endorsement of the concept of professional development and proposed approaches for undertaking this responsibility are incorporated in professional development guidelines that have been approved by the Treasury CIO Council. These guidelines will be in the inaugural issue of the Department's Information Technology Manual.

3.4.3 Management Training for the Technical Manager

There has been substantial support among the bureaus for management training that focuses on the unique challenges that technical people encounter when they move into the ranks of management and have to manage their peers. To try to get a better understanding of bureau needs, the ITWIP cooperated with the University of Virginia by hosting an interagency focus group on June 9, 1998, to evaluate UVA proposals for a Technology Leadership Certificate. The group heartily endorsed the idea of a program of broad scope and intensive training for new technical managers. It also recommended that the Department consider using UVA or developing its own program and that it include multi-bureau participation.

3.4.4 Project Manager Training

Another mid-career training program that has drawn substantial interest is the Project Management training program that IRS had in place. Treasury bureau CIOs were surveyed for their needs on May 14, 1998. Based upon this interest, IRS revised the program and awarded a successor contract for one base and four option years on December 15, 1998. The contract was broadened to satisfy the project management training needs of the entire Treasury Department. This program will lead to certification by the Project Management Institute should managers go through the skills assessment and pursue the full course of study that applies. This program will be totally reimbursable; no Departmental funding was necessary for its establishment. IRS had been able to achieve approximately a 15% cost reduction in commercial rates through its former contract; the new contract is achieving over a 30% to 40% discount in commercial rates.

3.4.5 Treasury School of Information Technology

A partnership with the Internal Revenue Service School of Information Technology was established through an agreement signed by the Treasury CIO and the IRS Chief Officer for Management and Administration on August 28, 1998. The "Treasury School of Information Technology" (TSIT) was chartered to serve the needs of the entire Treasury Department. The charter calls upon the TSIT to meet the workforce improvement needs of the Department and to provide cost-effective training solutions for the development of IT skills and career enhancement initiatives. In December 1998, an Executive Advisory Board was created. This Board will set

direction, policy and priorities for the School. We anticipate that membership on this board will rotate on an annual basis.

Treasury's buying power can cut bureau costs by consolidating requirements. This is especially the case when new distance learning technologies, such as Web-delivered computer-based training and interactive video teletraining are used to deliver technical training programs. Under the auspices of the IT Skills Enhancement Subcommittee, IRS is already offering several of its teletraining courses on a no-cost trial basis. IRS is investing two staff years (and two more on detail to Treasury) in FY 1998 to get this program underway with the intent of capturing its costs in FY 1999 and beyond through reimbursements by its sister bureaus.

3.5 Outreach and Recognition in National and International Forums

Treasury's work on executive IT competencies and IRS's work on computer specialist technical competencies have been presented in a number of public forums, including:

International Quality and Productivity Center Session on Information Technology Metrics for Government Agencies
Treasury and IRS were featured as innovators in using a competency framework to establish measures for the skills and performance of technical personnel involved in information systems work. IRS's Curriculum Information System was demonstrated.

The Eighth Annual Government Financial Management Conference
By participating in the Treasury Center for Applied Financial Management's Annual Conference, the ITWIP gained recognition for its actions in improving the competencies of information system personnel supporting financial systems. The presentation also gave the IT Workforce Improvement Program an opportunity to respond to and contribute to the Chief Financial Officer Council proposals relating to financial competencies for IT personnel. The need for collaborative teams with a mix of competencies was recommended as the pattern for the future.

The Vice President's Reinvention Revolution III Conference
Treasury was featured as a leader in federal responses to the Clinger-Cohen legislation and the national IT workforce shortage. This was a joint presentation with the Information Technology Association of America, Computer Associates, Inc., Computer Sciences Corporation, the Education Department and the Commerce Department. The ITWIP organized the presentation in support of the conference.

The Federal Computer Week CIO Summit on Workforce Planning in Information Management
At this conference, Treasury made a plenary session presentation on its workforce improvement program and on the IRS Curriculum Information System. This presentation provided an opportunity for the Treasury Department to demonstrate its strategy and tools for workforce improvement to a national forum of federal, state and local chief information officers. More than 20 of the conference participants made individual requests for further information and background on the Treasury approach. A number of the agencies represented at the program (including

NASA and DOE) have since indicated that they are modeling their programs after that of the Department of the Treasury.

The European Public Sector Information Systems Conference and the Computers Committee of Great Britain
Based on the presentation at the Federal Computer Week CIO Summit, the ITWIP Program Manager was invited to Birmingham, England, to address the plenary session of the European Public Sector Information Systems Conference (EPIC) on Information Systems in Support of Better Government. This conference provided Treasury with an opportunity to influence an even wider audience with its work. This conference not only provided a forum for promoting Treasury's accomplishments, it also established continuing U.S.-U.K. collaborative relationships that are sending new ideas to both countries. Continuing communication has taken place with British organizations facing the same challenges in their efforts to manage and improve their IT workforce.

The presentation to the Computers Committee of Great Britain focused on recruitment and retention with an emphasis on the latter. It provided an opportunity to share U.S. experience and to hear the concerns of British practitioners in the information systems field.

The Society for Information Management Interchange 98 Conference
On behalf of, and at the request of, the Federal CIO Council Education and Training Committee Chairman, the ITWIP Program Manager addressed the plenary session of this conference. The Society for Information Management is composed of approximately 2,700 of the top IT managers in the private sector. This conference provided the Department with the opportunity to discuss the overall federal response to the IT workforce shortage and to highlight the Department's innovations in responding to this issue.

3.6 Participation in Government-wide Efforts

Treasury has been actively involved in interagency work teams that are: 1) reviewing the government-wide CIO competencies; and 2) reviewing government-wide strategies for IT skills management. The Federal CIO Council Education and Training Committee adopted a number of Treasury proposals for improving and simplifying the federal CIO core competencies which serve as a government-wide baseline for IT skills. Specifically, the components of two of the ten core competencies were rewritten to match Treasury proposals. Additionally, a number of other sub-items from the core competencies were revised based on Treasury's experience in trying to validate the competencies with its executive corps. Treasury was the only federal agency which had actually performed validations of the competencies before attempting to apply them.

Along with the General Services Administration and the Office of Personnel Management (OPM), the Department took a lead role in planning and organizing a national effort to review federal programs related to the recruitment, retention and development of IT personnel. This national IT Workforce Challenge effort will be focused on government-wide actions that may be beyond the scope of actions available to federal agencies under current law and policy. Treasury has had

membership on and contributed to the work of each of the Workforce Challenge subordinate committees. Along with GSA and OPM, it has been a regular participant in strategy and direction discussions. Treasury has also been highly involved in working with Armed Forces Computer and Electronics Association (AFCEA) to sponsor the Workforce Challenge Forum at its February 1999 Virtual Government Conference. The IT Workforce Challenge Forum offers the federal government the opportunity to collaborate on changes of mutual benefit among all agencies and to provide an opportunity to reexamine systemic practices which may inhibit the Federal government from competing for scarce IT resources.

Because of its role in Education and Training Committee efforts, Treasury was asked to work with GAO to present the progress and accomplishments of the Committee to the annual GSA Information Resources Management Conference in September 1998. Treasury also presented the findings of its track sessions to the plenary session of the conference. Treasury's efforts were recognized by GSA through the issuance of a Certificate of Recognition from the Administrator of the General Services Administration to the Treasury IT Workforce Improvement Program Manager. Treasury has also received notice for its work in *Government Computer News, Federal Computer Week, IT Review* and *PC Week*. Treasury was invited to describe its program to the Health and Human Services CIO Advisory Council and this group followed up with requests for samples of the Computer Specialist competency work done by IRS and the Treasury Senior IT Management Assessment Questionnaire and supporting material.

CHAPTER 4 -- DEVELOPING THE BEST IT LEADERSHIP IN GOVERNMENT

The top IT leadership of the Department controls substantial resources. Total Treasury Department IT expenditures for FY 1999 will be $2 billion. About 9,300 employees are working on IT projects and about one third again as many contract staff were involved in IT work. Department IT spending is approximately 16% of the Department's total operating budget; this contrasts with many private sector companies where the goal is to keep IT spending at 1% or less of total spending. These staffing and funding commitments reflect the degree to which the Department is in the information business and is dependent upon reliable and effective information systems to accomplish its mission. The Treasury CIO Council determined that Treasury's assessment of IT skills should begin with the top IT decision-makers in the Department.

4.1 Background

The first challenge in assessment was to establish an agreed upon baseline for this assessment. Although Treasury IT executives have jobs that are similar across bureaus, they also have particular unique skills that make them effective in their organizations. The IT Skills Enhancement Committee agreed to try to pilot the new Federal CIO Council core competencies to see if they would reflect the range of executive performance. However, early in this process it was determined that many of the competencies were vague and imprecise. Therefore, a new framework using the CIO core competencies as its basis was built.

4.1.1 *Maryland Consulting Associates (MCA) Study*

To gain an outside perspective on its leadership competencies, the IT Skills Enhancement Committee sponsored a University of Maryland Business School Group Field Project. This project provided the joint benefit of career development for the students and objective analysis for the Department. The group, styling itself as Maryland Consulting Associates (MCA), was asked to take the Federal CIO Council core competencies and: 1) provide more specific definitions to the functional job descriptions in each area; 2) provide "behavioral characteristics" for each definition; and 3) interview/survey CIOs and their direct reports on the validity of the Federal CIO Council work and MCA's definitions. MCA developed a survey document identifying and illustrating the competencies and asked that respondents rate these competencies regarding their need to have: 1) knowledge of; 2) ability to craft or use; or 3) neither knowledge of nor ability to craft or use the competency. The survey was field tested in interviews with two CIOs and eight direct reports during the period October 15-17, 1997. Based on these interviews, the survey was revised and distributed to all bureau CIOs and direct reports. Eleven CIOs and 47 direct reports from a total of 13 bureaus were interviewed between October 23, 1997, and November 27, 1997. MCA delivered a final report on December 11, 1997.

MCA confirmed the importance of four major competency areas: 1) Federal IRM Competencies (later retitled Policy and Organizational Competencies to better reflect its content); 2) Capital

Planning Competencies; 3) Managerial Competencies; and 4) Technical Competencies. There were ten subordinate competencies within the four broad areas. Through its interviews and surveys, the MCA brought definition and clarity to the CIO core competencies. MCA recommended that Treasury use the revised list for annual personnel assessments, hiring, training and remuneration of Treasury IT executives.

4.1.2 Adoption of Core Competencies for IT Executives

The MCA study was reviewed by the IT Skills Enhancement Subcommittee and the Treasury CIO Council. A number of changes were made, including elevating technical competencies to an equal level with illustrative competencies for the other three major areas. In general, however, changes were modest and were of a clarifying nature. On March 12, 1998, the Treasury CIO Council adopted the MCA competencies as revised by its IT Skills Enhancement Subcommittee and agreed to an assessment based on these competencies.

4.2 Senior IT Management Assessment

On May 14, 1998, the Treasury CIO Council approved an assessment strategy. The Council approved a self-assessment survey approach. It was further decided that the survey would be anonymous and would be conducted by an independent third party. Finally, it was agreed that results would be reported on a consolidated basis and used for organizational analysis rather than individual performance assessment or individual development planning.

In August 1998, Dougherty Associates, Inc. (DAI), a research contractor, was hired to undertake this effort. The purpose of this effort was to conduct an analysis to determine to what degree Treasury's IT senior management corps possessed the identified competencies. Therefore DAI was tasked to develop an assessment instrument that measured individual, CIO collective, and bureau collective levels of current capability relative to the identified competencies, conduct an assessment, report on the results and draw appropriate conclusions.

The Senior IT Management Assessment survey achieved a 77% response rate and is considered representative of the Department's top technology officers. It identified valid and reliable data about the importance, frequency and developmental need for each competency. Based on these findings, DAI provided conclusions and recommendations to support the developmental needs of CIOs and their direct reports and managers. The final report was approved December 14, 1998.

4.2.1 Methodology

The assessment took place through an Internet-enabled questionnaire from October 1-21, 1998. DAI used a program called Raosoft EZSurvey to develop and administer the survey via the Internet. With this program the survey was quickly developed and loaded on DAI's Web server. To complete the survey, respondents went to DAI's Web site, downloaded the survey, and answered the questions on-line. Using DAI's Web page assured additional confidentiality to the respondents. Respondents were given passwords which prevented unauthorized input to the database. Data collection was efficient as well; once a respondent completed a survey, the data was automatically downloaded into a database DAI created specifically for this effort. Data was

then transferred directly into the SPSS statistical program, thereby avoiding key entry errors.

4.2.2 Survey Items

The competency definitions and behavioral characteristics were used as a basis for DAI's survey item development. In addition, the survey included items which DAI selected from large-scale publicly available surveys and other surveys that it itself had conducted and validated. These surveys included: the Department of Defense Senior Executive Service Core Qualifications Study; the Leadership Effectiveness Inventory (U.S. Office of Personnel Management); Skillscope (developed by the Center for Creative Leadership); and the Leadership and Management Competency Inventories (HayGroup, Inc.). The use of a mix of relevant items from these validated and reliable surveys helped increase the reliability of Treasury's survey.

4.2.3 Demographic Items

The final section of the survey included demographic items, such as each respondent's IT investment role, responsibility, retirement eligibility, and training experience. The questionnaire was pre-tested to assure that survey instructions were clear and that response categories were few, clear and distinct. DAI clustered bureaus by size (small, medium, and large) and conducted subgroup comparisons. The table below outlines this grouping. "Small" bureaus were those entities of less than 1,000 total employees. "Medium" bureaus were those of from 1,000 to 5,000 employees. "Large" bureaus were those of over 5,000 employees. The Treasury-wide CIO organization was placed in the "Large" category in this analysis because of the scope of its responsibility. The table below shows the breakdown:

Table 2 -- Grouping of Treasury Bureaus

Small Bureaus:	Medium Bureaus:	Large Bureaus:
FinCEN	ATF	Customs
FLETC	BEP	IRS
Inspector General	BPD	Treasury - CIO
	FMS	
	Mint	
	OCC	
	OTS	
	Secret Service	
	Treasury - ASD	

4.2.4 Rating Scales and Response Categories

Respondents rated each competency overall and each component of the competency using three separate scales:

Scale 1: Importance

The importance of this behavior for my position is:

- Very Important
- Important
- Moderately Important
- Unimportant
- Very Unimportant

Scale 2: Frequency

The frequency with which I have displayed this behavior during the past year is:

- Extremely Frequently
- Repeatedly at Various Times
- Occasionally
- Once or Twice
- Never

Scale 3: Developmental Need

My need to further develop my skills in this behavior is:

- Very High
- Somewhat High
- Neither High nor Low
- Somewhat Low
- Very Low

4.3 Survey Results

The survey further validated the Treasury CIO core competencies for use with senior IT managers by affirming that the competencies evaluated were used frequently and determined highly important by Treasury IT senior managers. It also provided some insight into the organizational roles of these managers.

4.3.1 Validation of Treasury CIO Core Competencies

Analyses were undertaken by organizational level and by bureau size. The three organizational levels identified were: (1) CIO's and Deputy CIOs; (2) Direct Reports to CIOs or Deputy CIOs with broad functional IT responsibilities; and (3) other Executives or Managers with IT responsibility. For each competency, the importance, frequency, and developmental need of each level was assessed. Importance and frequency rankings are the most important in determining whether or not we are measuring the most important aspects of senior IT management competencies. This section highlights the results of those measures.

4.3.1.1 Overall Importance Ratings of Competencies
Across all ten competencies (shown in Table 3, page X), the ones rated as most important (highest mean [˜] ratings) were Leadership (˜=4.9) and People Management (˜=4.8). No competencies had a mean importance rating less than a 4.0, indicating that overall, the items selected for the "Senior IT Management Assessment" were valid items for assessing these competencies.

This analysis was further broken down by level of employee reporting. This revealed that Leadership is rated as being very important for all three levels. Results between levels differ, however, for a few of the competencies. CIOs or Deputy CIOs rated Mapping IT to Mission, Budget Process, and Acquisition as having higher importance to their position than do Direct Reports or Executives/Managers. Conversely, Executives/Managers rated Process Management as being more important to their position than do Direct Reports or CIOs and Deputy CIOs.

The only mean importance rating under a mean of 4.0 was for the Acquisition competency for Executives/Managers (˜=3.8). However, the variability in responses to the Acquisition competency by these Executives/Managers is high, indicating less agreement among respondents for the importance of this competency.

Respondents felt that all of the ten competencies were important behaviors for their positions (all received a mean rating over a 4 on a 5-point scale). This suggests that the competencies selected for inclusion in the IT assessment are valid indicators for assessing organizational competencies.

4.3.1.2 Overall Frequency Ratings of Competencies
When asked to indicate the frequency with which they have displayed behaviors associated with each competency, respondents indicated that they perform Leadership (˜=4.5), People Management (˜=4.4), and Technical (˜=4.4) duties most often. The competency performed least frequently is Acquisition (˜=3.5). Yet as with the Importance rating, this competency is the only one of the ten on which respondents agreed less often (s>1.00).

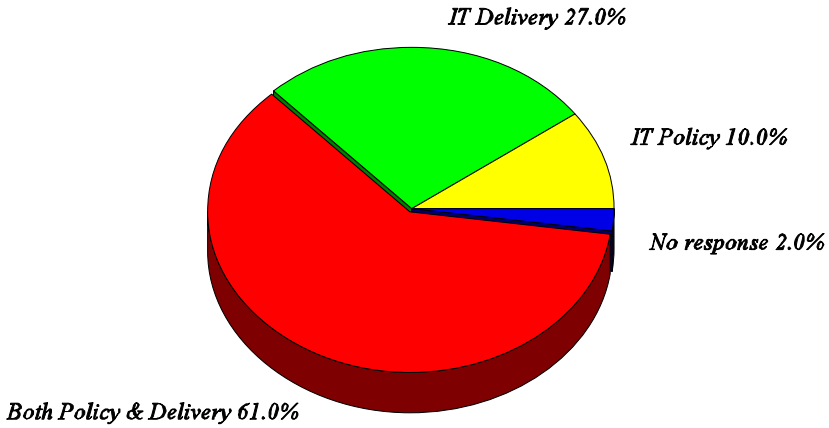
Across most competencies, CIOs and Deputy CIOs have used each competency more frequently than have Direct Reports and Executives/Managers. This trend is especially true for the following four competencies: Mapping IT to Mission, Budget Process, Acquisition, and Process Management. Among all three levels, respondents most frequently use technical competencies, People Management competencies, and Leadership competencies. All competencies were rated as being employed frequently, therefore they form a reasonable and valid framework for senior IT management development and succession planning.

4.3.2 Roles of Treasury Senior IT Managers
One challenge in developing strategies for improving Treasury's IT leadership is recognizing the different roles it plays in each bureau. In order to gain a better understanding of this framework, we asked executives to characterize their roles in IT policy and delivery and their role in agency IT investment decision-making.

4.3.2.1 IT Policy and Delivery

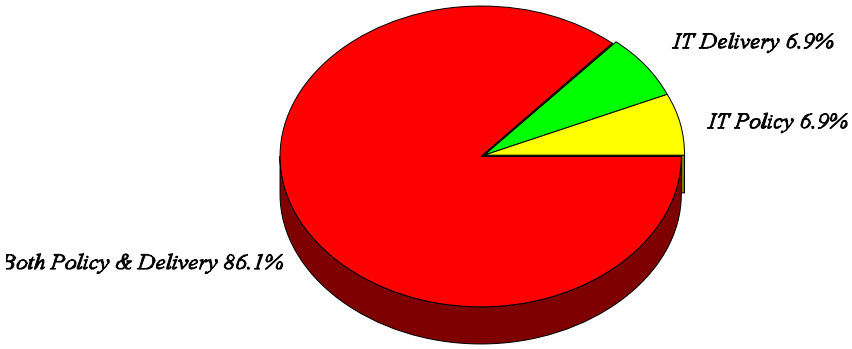
Most respondents (61%) report that they are responsible for both IT policy and IT delivery; the higher levels report more often that they are responsible for both policy and delivery. When CIOs and their direct reports were asked this question, they provided an even more overwhelming picture of mixed responsibilities. Specific subgroup analyses showed that across all three bureau sizes, results were consistent with the overall percentages shown in Figure 1.

Figure 1: All Respondents: IT Policy and Delivery Responsibilites



However, when examining these responsibilities by organizational level, a different pattern of results appears. CIOs and Deputy CIOs report that they have responsibility for both IT policy and IT delivery more than do Direct Reports or Executives/Managers (see Figure 2).

Figure 2: CIOs/Deputy CIOs: IT Policy and Delivery Responsibilites

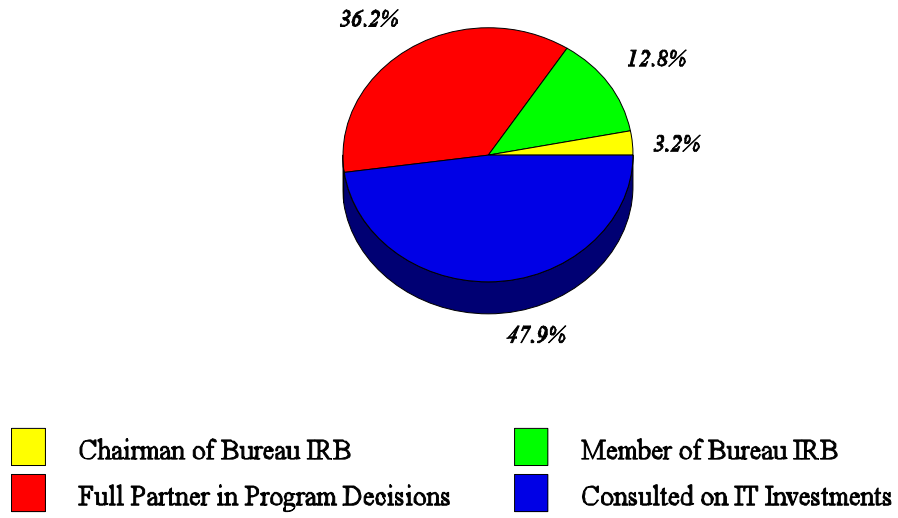


Such a range of duties indicates that Treasury's bureau CIOs are functioning in the way that the Clinger-Cohen Act intended, with full authority over IT policy and delivery.

4.3.2.2 IT Investment Responsibilities

Across all respondents, nearly half consult on IT investments, and approximately one third are full partners in program decisions involving IT investments. Even taking into account that 17% of respondents were not CIOs or direct reports, this level of participation in IT investment decisions seems low. Only about half of these officials are either board members or consider themselves a "full partner in program decisions involving IT investments." This seems far less than the "seat at the table" which is contemplated for top IT executives in the Clinger-Cohen Act. Even if all CIOs were on Investment Review Boards, there would seem to be a knowledge and experience gap at the next level. Treasury's top IT executives have significant roles in both policy and operations. They seem to have a lesser role in IT investment decision-making. Treasury should take actions to enhance IT leadership participation in IT investment decision-making.

Figure 3: Respondent's IT Investment Roles



4. 4 Implications for Executive Development

The most important finding regarding development needs for current executives is that their development needs are very diverse and individual. This argues against sweeping programs that would address the universe of current IT leadership. There does seem to be consistent emphasis on the need for leadership skills and this should be addressed in concert with other Department initiatives underway. Finding training and development interventions that can be fit into the schedule of busy executives is a challenge. The study provides some insight on this as well.

On the other hand, the variety of skills represented among current senior IT management and their lack of time for development suggests that it may be appropriate to consider more formal, longer

term development programs for the IT leaders of the future. The Treasury CIO competencies can contribute to this planning.

4.4.1 Variation in Needs

Although there is great consistency across all bureaus and levels of management regarding the importance and frequency of use of executive IT competencies, there is far less consistency regarding the identification of areas in which IT executives need developmental experiences. The table below summarizes the findings from the Senior IT Management Assessment.

Table 3: Mean Competency DEVELOPMENTAL NEED Ratings by Organizational Level

Competencies	ORGANIZATIONAL LEVEL		
POLICY AND ORGANIZATIONAL	**CIO or Deputy CIO**	**Direct Report**	**Executive or Manager**
Mapping IT to Mission	3.0	3.2	3.1
Budget Process	2.5	2.9*	3.7
Organizational Processes	3.2	3.1	3.3
CAPITAL PLANNING			
Investment Assessment	3.3	3.1*	3.4*
Acquisition	3.1	3.0*	2.9*
Implementation & Performance Measures	3.5	3.4*	4.0
MANAGERIAL			
Leadership	3.0*	2.7*	3.2*
Process Management	3.2	3.0	3.2
People Management	2.7	2.9*	3.3*
TECHNICAL			
Technical	3.3	3.1*	3.3*

* The standard deviations associated with these means is equal to or greater than 1.00

Each asterisk in this table indicates a standard deviation of difference among the respondents. Statistically significant differences in 13 of the 30 cells of the table contrast sharply with the results of the Importance and Frequency measures. In each of those tables, there was statistically different

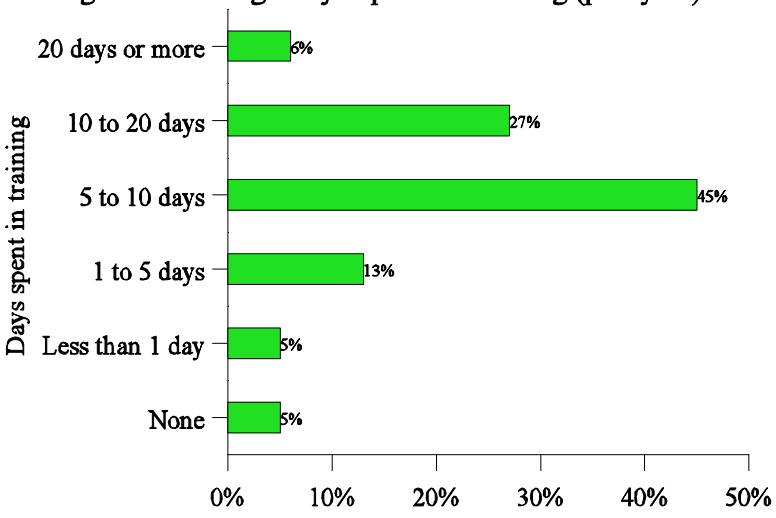
variation in only three of 30 cells in the tables. The high variability in responses for Developmental Need within each competency likely indicates that current senior IT managers possess a wide variety of skill sets. It is apparent that not all people require development in each competency. Therefore, developmental activities for current senior IT management must be closely tailored to each top manager's individual needs.

The one exception to this individualized development planning would seem to be Leadership. The Leadership competency was rated as the most important and most frequently used competency, across all levels assessed in this study. Since these leadership skills are required to a great degree, the refinement and further development of leadership skills is essential.

4.4.2 Opportunities for Development

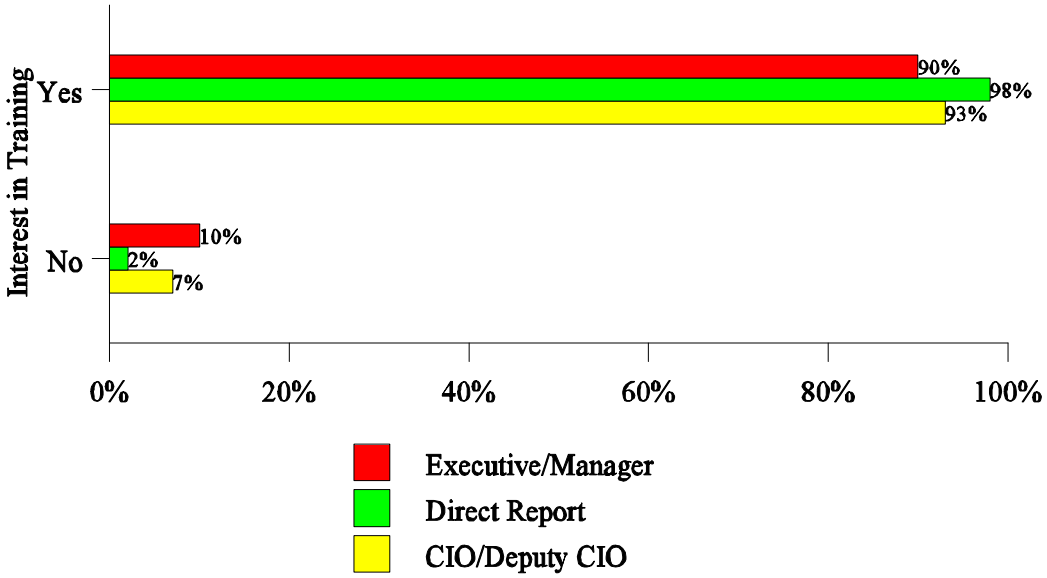
In addition to identifying development needs, the survey sought to identify barriers to training or opportunities to tailor programs appropriate to this group. The first training question asked respondents approximately how many days they spent in work-related training in the past year (between 10/1/97 through 10/1/98). Respondents were to include attendance at conferences, executive training programs, and all other job-related training in their estimate. Figure 4 shows the percentage of respondents who checked one of six provided alternatives. Results show that most (45%) spent between five to ten days (one to two weeks) in job-related training during the past year.

Figure 4: Average Days Spent in Training (past year)



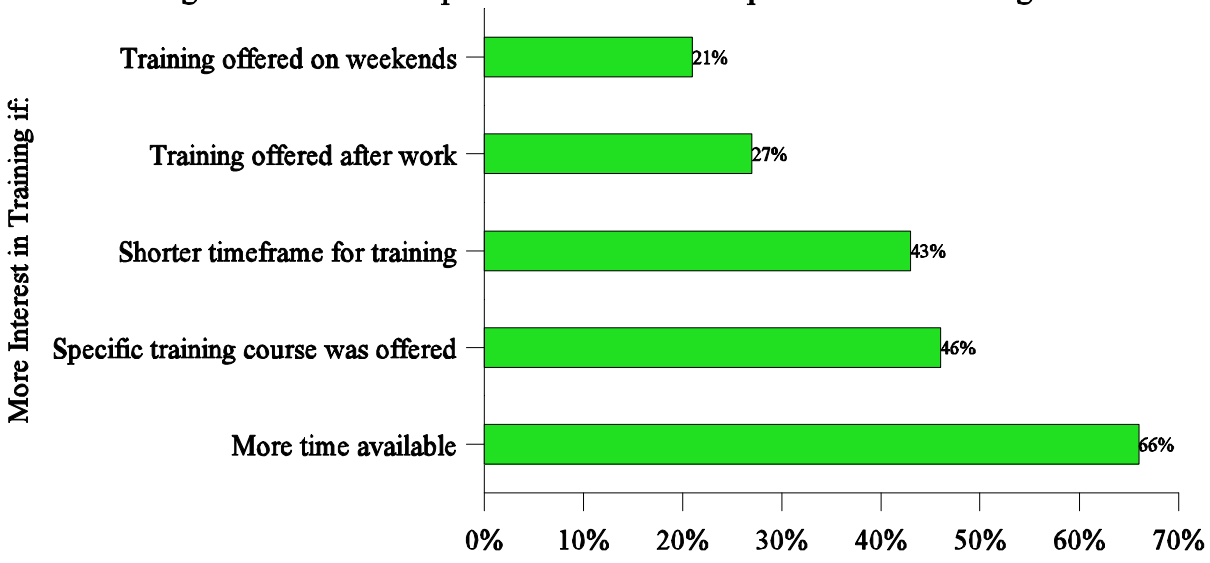
A second training-related question asked respondents whether they were interested in participating in more job-related training. Nearly all indicated that they would be (see Figure 5):

Figure 5: Interest in Training, by Organizational Level



The final question concerning job-related training looks at barriers to participating in training. As shown in Figure 6, the lack of time available to participate in training is the main reason respondents do not participate in more training courses or programs.

Figure 6: Reasons Repondents Would Participate in More Training



4.4.3 Enhancing Development for Current Senior IT Management
Most respondents have participated in training over the past year, however nearly all respondents wish to have more training, especially if it were presented in a shorter time frame, and if the courses they were interested in were offered. Approximately one in four also stated that they are interested in training courses which are offered over the weekends or after work.

The bottom line from this analysis is that Treasury's senior IT management is overwhelmingly interested in participating in training and self-development activities. It is also highly motivated and willing to participate in evening and weekend programs when these programs are targeted to needed competencies. The challenge is in finding the right programs and getting the endorsement of top agency management for their participation. It is also clear that because of the variance in needs, cross-bureau programs are more likely to attract adequate numbers of participants than are intra-bureau programs.

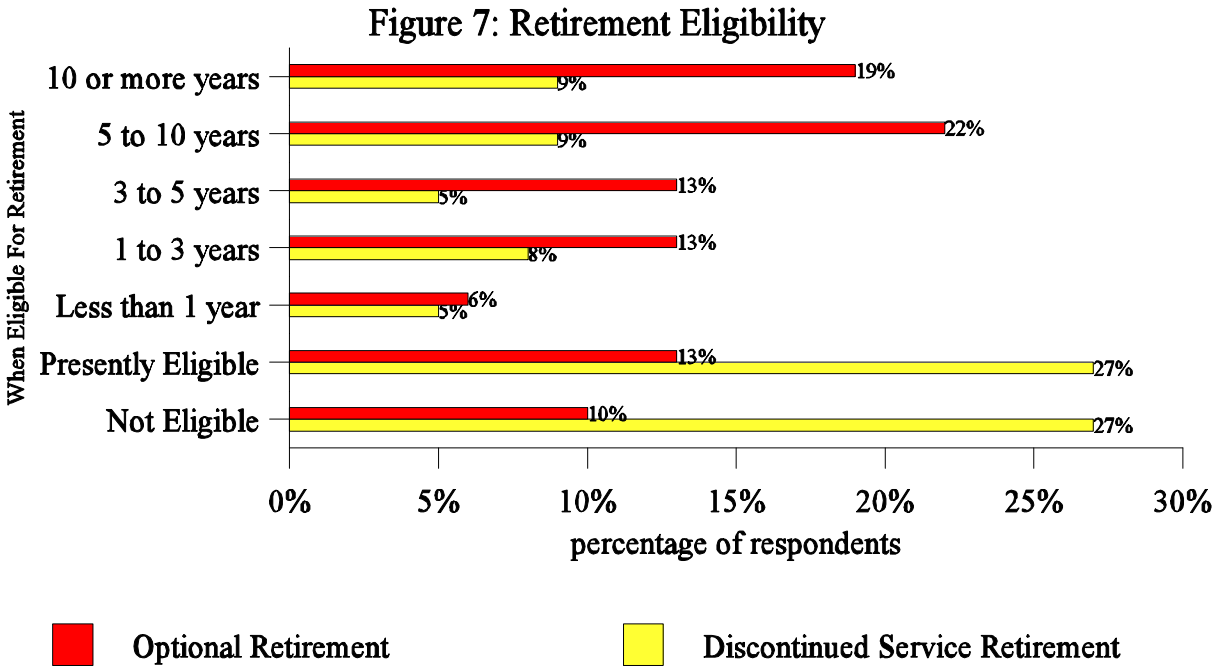
We have begun to meet the development needs of current CIOs through the IT Track at the Treasury Executive Institute. This allows them to get periodic updates on important technology and management trends and to network with their program counterparts in Treasury. Additionally, at its January 20, 1999, meeting, the IT Skills Enhancement Committee approved Treasury's participation in the Information Management Forum. This is an organization made up of predominantly private sector organizations. It holds short meetings (usually 1-3 days) at which IT practitioners from member organizations share challenges and accomplishments on common technology issues. This allows networking with peers and the achievement of a broader perspective on IT issues. Finally, GSA is developing the concept of CIO University. It is in the process of breaking each of the federal CIO core competencies into specific learning objectives for executive management. Specific programs for improving skills in all competency areas will be built. This would allow Treasury executives to develop their skills in an area where they wish to improve even if the area would not have wide applicability across Department senior IT management.

Recommendation 4-1: Current Treasury senior IT management should use the Treasury CIO competencies to: 1) form the basis for an ongoing assessment of their skills; and 2) build an individualized development plan to improve their skills.

4.4.4 Developing IT Managers for Executive Succession
It is not adequate to simply focus on the needs of current executives. Indeed, by their performance they have already demonstrated a breadth of skills. However, this current cohort group of executives is nearing retirement eligibility and may be attracted to outside positions by the current high demand for IT skills. Also, the Senior IT Management Assessment points up some weaknesses in our current approach to selecting and developing executives by demonstrating that there has not been enough attention on ensuring that the competencies that they themselves value are being developed in their subordinates.

Retirement eligibility of the IT senior management is a concern for the Treasury Department. The

survey included two questions that asked respondents to indicate when they are eligible for either optional retirement or discontinued service retirement. Figure 7 demonstrates that 45% of respondents will be eligible for optional retirement in less than five years. These results are most dramatic at the CIO/Deputy CIO level, where 53% are eligible for optional retirement in less than five years. Clearly, there is an urgent need to begin to prepare the cohort group below the CIO ranks to perform that range of duties.



As noted above, there are considerable differences between CIO IT investment, policy and operational responsibilities and those of their subordinate managers. Additionally, organizational level comparisons across the three levels of respondents show higher amounts of need among executives and managers in the areas of Budget Process, Implementation and Performance Measures, Leadership, and People Management. Within all three levels, respondents indicate that Implementation and Performance Measurement was the area in which they felt the greatest desire for further development.

Finally, the fact that there is so much variance among the development needs for our current senior IT managers corps gives us cause to reexamine how we are preparing executives for these duties. To adequately address the full skill set necessary for IT executives, we must change our selection criteria and require a breadth of experiences to enter. Further, we must develop a more comprehensive program of development activities so that those selected are able to perform in these roles in an outstanding manner.

Development of future senior IT managers can be less tailored and more broad based. Although many of these officials are in important jobs now, time is less likely to be the inhibitor towards training that it is for those already in the top jobs. Longer term training is feasible.

One important first step is to identify a target set of skills. The Treasury CIO competencies can provide such a target across the Department. Currently, nearly every top position (although it may contain the OPM executive core qualifications) contains a unique expression of technical and managerial skills appropriate to a position. By adopting the validated Treasury CIO competencies as a uniform core of senior IT management skills, the Department could make it easier for employees to understand what skills they needed to succeed at the top level. To the extent that they pursue their own development, they could better target their efforts. The Department could further reinforce its commitment to these competencies by making them the core selection criteria for senior IT management positions.

Managers can also be aided in acquiring the skills they need through short and long term training efforts. GSA contemplates that managers desiring CIO-level positions could go through a thorough CIO University program and gain a formal certificate that demonstrates that they have the breadth of skills needed for CIO positions. Several bureaus in the Department have used the Department of Defense Information Resources Management College as a long term development program for their promising mid-level managers. Also, Treasury has investigated the idea of piloting a public sector-private sector exchange program that would allow senior Department managers to gain private sector experience in cost and resource management and bring these skills back into the Department. The National Academy of Public Administration and the Private Sector Council have indicated a willingness to partner on such an effort.

Recommendation 4-2: The Department should use the Treasury CIO core competencies as a basis for: 1) establishing more uniform announcement and selection criteria for top Department IT positions; 2) establishing more formal development programs for IT managers which provide them with better insight into investment and IT policy decision-making; 3) emphasizing interaction and teamwork between program and IT executives; and 4) integrating longer term, more comprehensive and more broadly based development programs into the development activities of IT leaders.

CHAPTER 5 – ENHANCING THE IT SKILLS OF NON-IT EXECUTIVES

Although our efforts over the past year have focused on the daunting challenge of maintaining and upgrading our IT workforce, the Clinger-Cohen Act gives a broader mandate to the CIO. All agency personnel IT skills are to be assessed and improved.

Top IT decision-makers have the greatest impact in their sphere. That is why we began our IT workforce review with that group. Likewise, we believe that an assessment and development program for IT skills across the rest of the Department should begin with an analysis of what skills are needed by top program executives and then designing developmental opportunities that are responsive to those needs.

With the Clinger-Cohen focus of program participation in IT strategy, planning and funding decisions, it is even more critical that IT and non-IT program managers form a working partnership based upon genuine understanding and cooperation. In Chapter 4 we discussed the need for IT executives to be fully developed with a broad range of competencies. Critical components of these are communication skills and a thorough understanding of the mission objectives of their non-IT executive counterparts. Teamwork, however, is a two-way street and it is also necessary that non- IT executives develop their own IT competencies. We recommend that a baseline level of IT knowledge and experience and project management knowledge and experience be established as prerequisites in the career planning and succession planning of non-IT program executives.

5.1 Industry Trends

As technology offers the opportunity to eliminate former distribution channels and provide the opportunity to interface directly with the public (e.g., selling savings bonds and coin proof sets over the Internet), it is becoming more and more critical for functional business executives to work together with IT executives and managers in aligning IT to the business mission. The mix of responsibilities and the lines between functions is blurring and (in some cases) evaporating. In its October 1998 conference, the Gartner Group projected that by the year 2003, 10% of IT work will be done by non-IT staff. It also noted that IT technical skills will diminish in importance from 2/3 of an IT professional's job needs to only 1/3, with the balance involving technology management and business management skills (Source: InfoWorld, "New environment will require new skill for IT professionals of the future"). This reflects the growing trends of:
1) teamwork in systems design; and 2)direct access to systems and products by business functions and managers through the Internet. It demonstrates the need for a focus on teamwork from both the business side and the technical side as well as a need for both professionals to better understand each other's jobs and functions.

Communication and cooperation among IT and non-IT executives is not what it should be. In a

June 1998 survey of 213 CEOs and board-level executives, A.T. Kearney (a subsidiary of EDS) found that over 30% of these officials identified "IT/management of data" as one of their most important business issues (InformationWeek, June 22, 1998). Further, two thirds of these officials felt that business and technology issues in their organizations were not in alignment.

5.2 Treasury Department Experience

The Treasury Executive Institute Information Technology Track programs to date (Chapter 3) have been consciously designed with the goal of appealing to the IT and non-IT executive. Feedback from these sessions indicates that the non-IT executives desire a better baseline of knowledge in IT so that they can get more out of the programs. Similar requests have come from training and development communities in the Department and these have been endorsed by the Treasury Career Advisory Panel (TCAP).

The Secretary's 1998 Gettysburg Human Resources Strategies Conference also identified IT as a prominent concern of the Department's program leadership. Among 26 individual competencies evaluated, participants in the conference ranked "Technology Management" fourth in importance (in a tie with "Integrity.") It is clear from these indications that Treasury's program leadership sees this need.

Many of Treasury's CIOs and top IT leadership have indicated that one of the major benefits of the Clinger-Cohen Act has been the establishment of investment review boards with IT and non-IT program executive membership. This has allowed IT and program executives to get a much better mutual understanding of the capabilities and complexities of IT solutions to business problems. Likewise, IT architecture and requirements analysis must spring from partnerships between program and IT managers. Partnerships work best where all parties are informed on the basic issues, objectives, and technologies. However, many IT program executives entered their positions before IT was so key to their programs; also, many IT executives entered their professions while IT was seen as a way to count and account for resources, rather than as a primary delivery mechanism for services. The Department can benefit by beginning a process of education and development that will lead to improved understanding and better IT decision making.

It is important to get a better understanding of the IT knowledge and skill level of program executives before launching into a program of skill development. Therefore, we recommend that a general survey of IT skills and knowledge be conducted among this community. It would be less detailed and less comprehensive than the survey of IT leadership reported on in Chapter 4. Like the survey outlined there, it could be a self assessment of the importance of IT knowledge and skill in a variety of areas and a self-identification of developmental need.

Recommendation 5-1: Coordinate with the Deputy Assistant Secretary, Human Resources to better determine competency needs and skill levels in IT among non-IT program executives. Provide developmental opportunities geared to their needs.

CHAPTER 6 – IMPROVING IT MANAGEMENT DEVELOPMENT

In our detailed interviews with bureau CIOs and their top managers, two common threads emerged among the concerns expressed regarding management development. These were: 1) preparing technical employees to take on the challenge of managing their peers; and 2) providing technical managers with the skills to be effective project managers when their projects extend beyond technical parameters. In both of these cases, the ITWIP responded by conducting further research and by encouraging potential sources to respond to these needs.

6.1 Improving Management Skills for Technical Staff

Many technicians who enter management in IT organizations are not well equipped for the transition from independent creative work to team leadership. As a result, they are sometimes ineffective in management roles and can actually reduce the performance of their work units. Often they enter a long process of self-realization before they become effective. Although the move to management is a challenge in every occupation, it may be even more difficult for IT personnel. In general, these employees tend to be more introverted and independent and are less comfortable working in groups and obtaining consensus. Moving to management involves modifying many of the behaviors that have made them successful as independent workers. Beyond this, they must also be willing to broaden their scope and become less expert in the technologies and tools that have led to their success. In a business where technical knowledge is often the key to advancement, this can be a considerable sacrifice.

Nearly every Treasury CIO has recognized and experienced the challenge of developing outstanding technical managers. Two responses are appropriate to this situation. First, we need to identify and reward outstanding technical employees who do not have managerial skills or interests. They need to be given the opportunity to excel in technical work. Second, and equally importantly, we need to adequately prepare and support those who do show talent and aptitude for management in our technical organization.

6.1.1 Screening Super Technicians from Managers

More attention needs to be given to how people are chosen for management. Outstanding technical staff need to be promoted along a separate career ladder and not moved into management as a way of providing them with well deserved recognition and compensation. Talented IT professionals with valuable IT skills and competencies need to be rewarded for these contributions.

Treasury CIOs and their staffs feel hamstrung by the General Schedule classification system. The current classification standards do not address the unique issues associated with IT jobs which are: 1) constant, continuing changes to technology that make previously learned skills obsolete and competition for employees with newer or advanced skills all the more difficult; 2) the ability to compensate individuals readily for new or advanced skills that they have acquired; 3) market

driven compensation practices. The use of technology has increased exponentially over the past decade, while the number of IT professionals has not kept pace. For instance, a recent study by the National Academy of Public Administration found that there are approximately three IT jobs for every college graduate with a computer-related degree. Because IT skills are in such demand and the supply for them is limited, IT professionals can garner top dollars and benefits packages with which the federal sector cannot compete.

Most IT professionals are in the GS-334 series. The classification standards for computer specialist positions provide criteria for classification from the GS-5 through GS-15 levels; however, the full performance level of this series is GS-12. Consequently, when employees gain significant technical expertise in Data Base Management System Administration or Enterprise Resource Planning system development or any of a wide variety of other technical disciplines, the GS-12 salary is not a competitive wage. As a result, many bureaus work with their personnel teams to create unique jobs for these employees on a case-by-case basis or they promote them to management positions where they do not perform as well and where they become less current in technology. The result is a hodgepodge of practices and position descriptions among bureaus. The more salient point is that there is no clear path for the advancement from the technical ranks to the senior technical ranks even though we must advance these employees to give them a competitive wage and to keep them in our organizations. Moreover, the General Schedule classification system requires that a certain percentage of higher graded duties must be present in order for positions to be classified at higher grades. This sometimes places IT employees who occupy unique or individual jobs in a tenuous position (e.g., demotion) vis à vis future classification audits. Qualification standards for positions, likewise, sometimes present a dilemma for technical managers and personnel officials. Restrictions such as years of experience and time in grade often have little or nothing to do with the ability to do a job with the latest skills using programs and technologies that are newly available.

Treasury's quandary is not unique. Government-wide action is needed. Technical positions in the computer specialist series have become far more specialized and far more technically challenging than was contemplated when the series was originally established and even when it was revised some eight years ago. The fact that the classification standards have not kept pace with this constantly changing IT occupation has placed many difficulties on both IT and personnel staffs in classifying computer specialist positions. The result is that there is no available, straightforward approach to address this issue. IT employees should be rewarded for the productive application of their specialized knowledge to solve business problems, and should be able to set realistic career goals. However, the current framework of the classification system thwarts such efforts.

Recommendation 6-1: Request that the Office of Personnel Management review the GS-334 (Computer Specialist) occupational series and update technical categories within this series. Request that the Department's Deputy Assistant Secretary for Human Resources and the Deputy Assistant Secretary for Information Systems/CIO work with Bureau Personnel Officers and Chief Information Officers to establish realistic, common and predictable career paths for outstanding technical employees with exceptional knowledge.

6.1.2 Developing Management Skills in Technicians

It is important to develop, reward and provide predictable career paths for outstanding specialized information technology professionals. It is equally important to equip those chosen for management with the breadth of skills that they need. As noted above, the broad-based people-oriented skills needed for management are often alien to information technology professionals. A great deal of learning and practice is often necessary for technicians who make the move from technical to managerial work. The Clinger-Cohen Act has made this transition even more challenging by requiring that agencies take a more holistic approach to their IT programs. At an operational level, this means that managers at all levels of the IT organization need to work closely with their customers on program and financial project justifications and capital planning initiatives. Increasingly, effective IT managers must be good general managers and must achieve an improved business focus for their efforts.

In defining our needs, the ITWIP worked with the University of Virginia, Northern Virginia Center, to identify the skills and breadth of study and experience necessary for technical managers. On June 9, 1998, ITWIP hosted a focus group meeting to discuss this issue and identify the appropriate scope of such development activities. The focus group was composed of technical managers and executives from the Internal Revenue Service, the U.S. Secret Service, the National Aeronautics and Space Administration, U.S. Customs Service and the Federal Law Enforcement Training Center.

Among the participants in the focus group, there was strong support for a management preparation program which would provide new technical managers with a broad perspective on their jobs. Focus group members were presented with six topic areas with sub-elements illustrating each. They were asked to rate these areas and their sub-components in importance on a scale of one to five. Leadership and Human Resources were the top rated components of such a program, receiving unanimous “five" ratings from focus group participants. Project Management and Communications were rated next (4.75) in importance. Finally, Financial Management (4.5) and Understanding Technical Operations (4.0) were seen as important competencies. Based on the focus group input, the University of Virginia drew the following conclusions:

- There is a need for leadership training in high tech government.
- Time is at a premium for participants. Courses must be compact and offered at times and locations convenient for participants, including on-site at businesses and agencies.
- Instructors must have a “been-there, done-that” reputation.
- Government classes need a specific focus and need instructors familiar with government financial and personnel processes.

Treasury participants were supportive of training that covered a breadth of subject areas, was

targeted to the technical environment and provided for multi-bureau participation. Focusing on entry level managers is likely to have significant long term impact on Department IT management since these foundational skills are important at successive levels of management. We recommend the establishment of Department-wide programs to meet these needs. Such a program could reap substantial long-term benefits for the Department.

Recommendation 6-2: Coordinate with Department and commercial sources to develop a pilot training program for new technical managers. This program could be used both to establish a cadre of employees with management potential and to support the ongoing growth and development of current IT managers.

6.2 Improving Project Management Training

IT skill shortages and the demand for breakthrough strategic IT projects are leading to substantially greater use of contract support and substantially more complex project environments. Managing large complex projects is difficult. According to Government Executive ("On Time at Cost," September 1988), the Standish Group, a technology consulting firm, estimated that 40% of all software applications projects are canceled before completion and 33% suffer schedule overruns or significant mid-course scope changes. It estimated the cost of government and private sector failed or wounded projects to be approximately $145 billion each year.

Certainly, Treasury is not immune to this phenomenon. Significant information system projects have returned less than what was expected at higher than expected cost and have taken more time than had been expected. Contract support (such as the new Internal Revenue Service "Prime" Contract) can help, but these strategies themselves demand talented, experienced government project management oversight.

6.2.1 Requirements for Project Management

The days of IT projects being merely support or back room functions are gone. It is far more common now for IT projects to go to the heart of how services are delivered and how decisions are made. This programmatic impact means that modern IT managers need to have a far greater breadth of experience than their predecessors. They need to be more customer focused, more knowledgeable about program objectives and far more aware of implementation issues. Managing systems implementations over time requires more than an understanding of technology. It requires effective budgeting, detailed project planning with allocations for contingencies and risks, regular monitoring and management and an understanding of all of the ancillary issues in project implementation success such as: space planning, staff training (both technical and end user), communications, etc.

Across the federal government, there is wide consensus that IT performance is increasingly leveraged on the performance of IT project managers:

The government-wide Information Technology Resources Board issued a publication,

"Project Management for Mission Critical Systems," which draws on its reviews of mission-critical federal information systems projects and concludes that improved project management is critical to successful IT performance.

- When the Federal CIO Council was asked to approve a revision to the federal CIO core competencies, it identified Project Management as an area that needed to be lifted to the top ten critical competencies.

- When the ITWIP team visited Treasury's CIOs and surveyed their staff development concerns, the need to find, develop and retain skilled IT project managers was regularly identified. Throughout the Department, IT managers are increasingly relying on contractor support and projects are increasingly affecting the day-to-day processes and procedures of non-IT program managers.

Much of the Clinger-Cohen Act is directed at adding discipline and analysis to information systems project management. Requirements for long range planning, IT capital planning and project portfolio analysis and regular project review are included in the law. Further, subsequent OMB guidance, such as the Capital Programming Guide (July 1997) stresses the need to only undertake projects which will achieve strategic goals. As important as this structure is, however, structure does not guarantee success. In fact, too much diversion and intervention by upper management can stifle the initiative, creativity and independence necessary for project success.

6.2.2 Developing Project Management Skills

Although picking the right projects is critical, organizing and managing them effectively may be even more critical. To do this, Treasury must focus on selecting the right people for IT project management and on giving them the training and development opportunities that allow them to hone their skills.

The Internal Revenue Service School of Information Technology has had a robust project management training program in place for approximately 18 months. Working with the Project Management Institute Common Body of Knowledge, the IRS program allows project managers to undergo an assessment of their skills and to formulate a detailed program of training and development to acquire project management skills. Those successfully completing this program of training and project accomplishment can be certified through the Project Management Institute, a nationally recognized organization.

On May 14, 1998, the ITWIP surveyed the IT Skills Enhancement Committee and the Treasury CIO Council to determine whether or not and to what degree the IRS program could be expanded to serve the needs of the entire Department. Based upon input from the bureaus, this successful IRS program is being extended Treasury-wide. The new program provides for individualized assessment and broad-scope project management training. It achieves these goals at 30-40% discounts from commercial prices. The Department can best benefit from this program if its individual bureaus recognize its usefulness and use it to train their project managers.

CHAPTER 7 – DEFINING TECHNICAL COMPETENCIES AND STIMULATING DEVELOPMENT

IT hardware and software tools are constantly being changed and improved. IT professionals are being asked to keep up with all these changes and are simultaneously being required to work more effectively with their peers and customers and to better understand program needs and objectives. For these professionals to remain effective they must be involved in a process of continuous learning. Creating such an environment requires that the Department: 1) consistently invest in training and development of IT professionals; and 2) ensure that development funds build critical job-related competencies and take advantage of distance learning technologies.

7.1 Consistently Investing in Developing IT Professionals

In general, private industry recognizes IT staff training as a normal cost of doing business. Although the data available for both the private sector and the government is imprecise, it still is adequate to show a significantly different philosophy concerning staff development. Federal government and Treasury Department spending compare highly unfavorably to both general employee training commitments and IT staff training commitments. Some of Treasury's bureaus have made some notable improvements in IT staff development in FY 1998. However, to be effective these expenditure levels and development strategies must be consistent and continual. Finally, Treasury lags behind the private sector with respect to the formal education and certification of its IT employees; it must overcome some barriers within the federal personnel system in order to address this concern.

7.1.1 Industry IT Training Investment Practices

Developing technical staff requires adequate funding and commitment. In its report "Help Wanted 1998: A Call for Collaborative Action for the New Millennium," ITAA notes that 64% of its survey respondents identified fast-changing technology as the greatest challenge for IT training. It also quoted a 1997 InformationWeek survey stating that training was the "number one technique used by IT managers to attract and retain information technology professionals."

When the issue of training was put to top business IT leaders by the Society for Information Management, 97% agreed with the statement: "Organizations must fund ongoing training and education programs for their employees as a necessary operating cost to achieve the benefits of IT investments." Additionally, 96% agreed with the statement: "Greater collaboration between schools and corporations is needed to narrow the gap between what schools teach today and what is needed by industry tomorrow."

According to the Corporate Advisory Board (Stemming the Flight of IT Talent, September 1997), Price Waterhouse was spending $6,600 per year on each of its 3,200 IT workers. Computer Associates spends $15,000 in training on each of its 4,400 workers. These levels of expenditure

reflect commercial best practice to ensure that IT staffs provide quality, up-to-date advice and support for their clients. These expenditures reflect ongoing organizational priorities and strategies. They represent a commitment to clients to maintain strong IT skills support in the face of rapidly changing technologies.

The American Society for Training and Development reported in its 1998 State of the Industry Report on the overall spending for training all populations of employees (IT and non-IT). Its report states: "Training expenditures as a percentage of payroll grew from an average of 2.1% to 2.27% in 1996." It found that the IT industry was the third highest in percentage of employees trained (71%) and that it had by far the largest total training expenses per employee. IT employee training is expensive because of the cost of instructors (often with highly specialized skills), because of the use of lab environments for training and because staying up to date in IT requires continuous learning of new tools and techniques. New software products and versions and releases within those products are a regular part of the IT operational landscape.

Although raw spending levels are measures of input and are only a part of the formula for building and maintaining better skills, they do demonstrate organizational commitment to continuous learning. IBM, Motorola and Federal Express are examples of major corporations that dedicate 3% to 5% of their annual payroll to training their employees. They continuously provide this level of investment in tight budget years. The National Association of Manufacturers, representing one of the sectors of the economy which has traditionally spent least on development, issued a report in 1998 ("The Skills Gap/The Shortage of Qualified Workers: A Growing Challenge to America's Economy") in which it urged its 14,000 member companies employing 85 million people to invest "at least three percent of payroll costs to help their employees meet the technical requirements that will be required as we enter the 21st Century."

As expensive as technology training can be, not training and thereby losing employees (who leave to seek better career development opportunities) can be even more expensive. A Center for Innovative Technology-Northern Virginia Technology Council study found that companies in Northern Virginia are paying $2,200 on average annually for IT staff training. The study found that this rises to $3,400 annually for each new worker they recruit (The Washington Post, "In the Chips Now, But Maybe Not Later," May 22, 1997).

7.1.2 Federal IT Training Investment

In general, the federal government under-invests in training and does not differentiate in training its IT employees. The Vice President's 1993 Report of the National Performance Review (*From Red Tape to Results: Creating a Government that Works Better & Costs Less*) states: "Leading corporations view training as a strategic resource, an *investment*. Federal managers tend to view it as a cost." It also states: "Compared to the private sector, the federal government invests few dollars and scant time in technology training."

These conclusions are borne out by a July 1995 U.S. Merit Systems Protection Board Study (Human Resource Development in the Federal Government). This study found that only one in

six federal employees were trained in new technology and that Federal training budgets were 3/4% to 1% of payroll compared to 10% of payroll for "top rated companies" and 15-20% of payroll for the U.S. military. Even large private sector organizations often have a training culture: for example, Kodak provides a minimum of 40 hours of training to each of its 95,000 employees every year.

7.1.3 Treasury Department IT Training Investment

The Treasury Department is not investing adequately in its technical workforce. The most frequently used measures are training dollars per employee and training dollars as a percent of payroll. Using conservative assumptions, we estimate that in FY 1998 the Department devoted approximately 1.5% of its IT payroll to the development of its IT staff. This contrasts with national averages of 1-3% and world class technical organization averages of 8-10%. The table below provides a rough measure of Department spending in Fiscal Year 1998:

Table 4 --Per Employee Spending and Percentage of IT Payroll Spent on IT Staff Development by Bureau - FY 1998

Bureau	Total Spending on Development	Total IT Staffing	Average Spending Per IT Employee	Total IT Payroll	Percent of IT Payroll Spent on IT Staff Development
Small Bureaus (under 1,000 total employees)	$75,960	58	$1,310	$3,705,000	2.05%
Mid-sized Bureaus	$1,952,318	1500	$1,302	$108,892,000	1.79%
Large Bureaus (over 5,000)	$7,241,000	7742	$935	$493,896,000	1.47%
Total Department	$9,269,278	9300	$997	$606,493,000	1.53%

Sources: Payroll and personnel data from bureau submissions for OMB Circular A-ll budget data. Training costs collected in survey of bureau CIOs undertaken by the IT Workforce Improvement Program.

FY 1998 spending represents a significant improvement over historical spending levels. Total spending in FY 1998 was approximately $3,450,000 above FY 1997 spending. However, IRS alone is responsible for $3,000,000 of this increase. From FY 1997 to FY 1998, the Comptroller of the Currency increased its IT development spending by $575,000 (172%); this, along with IRS's spending, more than accounted for the difference in spending. Without these two bureaus, Department-wide spending on IT staff development actually declined in FY 1998.

In the years FY 1995-97, IRS invested in training at the FY 1997 level. Thus, during FY 1995-97, overall Department-wide training expenditures for IT staff training was slightly below 1% of payroll.

The patterns of spending are also revealing. Seven of the 14 bureaus spent over $1,000 per person on IT staff development in FY 1997 and six spent this much in FY 1998. However, only four did this two years in a row. Since training is in a discretionary budget account, it is often cut in times of financial pressure. It is not uncommon to see training halved or doubled by bureaus one year to the next. Such approaches are not calculated to develop a highly trained IT workforce. This approach is relatively consistent with federal practice. At the General Service Administration Information Resources Management Conference in September 1998, IT managers and executives were asked to characterize their organizations' training plans: only 10% said training funds were well spent with formal individual development plans; 52% said training funds were spent "reasonably well according to casual judgments;" and 37% agreed with the statement that funds were "spent loosely without much oversight or review."

7.1.4 Bureau Unique Programs

Individual bureaus which are doing a better job in this area include the Comptroller of the Currency, the Secret Service, the Bureau of the Public Debt and the Internal Revenue Service. The Comptroller of the Currency has recently significantly increased its investment in staff development. It is experimenting with the establishment of individual development accounts whereby $5,000 is allocated to each IT professional staff member each year for training. It then becomes the responsibility of this staff member to work with his or her supervisor to identify appropriate training alternatives. There is an incentive for the staff member to find the lowest cost, most effective training for them. This also allows for individually tailored programs.

The U.S. Secret Service has a very formalized and systematic program for training its IT personnel. Each IT staff member has an individual development plan and this is reviewed annually by the employee and the supervisor in conjunction with the annual performance appraisal process. Identified development needs are then summarized on a program basis and strategies are developed for meeting these needs. Where there is significant commonality in needs, the Service consolidates these needs and contracts for in-house training. This reduces costs and allows programs to be tailored to Service needs.

The Bureau of the Public Debt has a well-structured, comprehensive program of management and technical training. It estimates and plans for its needs in some detail two years in advance. Being remote to much commercial training, it has established a local fully networked PC training classroom and a mainframe training classroom. It uses its "warm-site" emergency backup facility to provide extra training rooms when needed. It has developed economical and comprehensive training programs for IT skills. Finally, it has enhanced management technical skills through the use of the Gartner Group and through senior level management training conducted bi-monthly at the Massachusetts Institute of Technology.

The Internal Revenue Service's Commissioner Charles Rossotti has committed to a program of IT staff development. As noted above, IRS IT staff development spending increased 75% from FY 1997 to FY 1998. The Commissioner has budgeted an FY 1999 budget at $11 million; this is 175% above FY 1997 spending levels. Such a commitment will not only help IRS, but should also benefit the entire Department to the extent that it strengthens IRS's School of Information Technology (now chartered to support the entire Department as the Treasury School of Information Technology).

These programs, however, are the exception. In general, there is not enough funding for training. Training requests are often initiated by the employees themselves and are oriented to particular interests and particular technologies in which they are working. Although this is an important component of the training decision, it does not adequately take into account the entire performance picture and does not provide a balanced, objective basis for spending scarce development funds. The scarcity of funds itself is given as a reason for this approach; if there is not adequate funding for meeting any but a small percentage of the training need, why expend the time and resources needed for a systematic look at workforce needs? Despite the strong commitment and innovative strategies of individual bureaus, the overall general picture is one of deteriorating skills in a career field in which keeping current requires lifelong learning.

Recommendation 7-1: We recommend that the Department establish guidelines and targets to encourage the bureaus to invest more heavily in the development of their IT staff. Such targets could have as their goal a three year program to bring annual skills investment in IT staff up from 1% of IT staff payroll to a consistent 3% of IT staff payroll on a bureau-by-bureau and Department-wide basis.

7.1.5 Promoting Formal Education and Certification of Treasury IT Staff

It is not uncommon for businesses to support the formal education of their employees. In response to a February 1998 random sample of all of its print subscribers (reported on June 15, 1998), InfoWorld reported that more than three quarters of respondents indicated that their companies offered tuition or education reimbursement. Although only 41% took advantage of these programs, 95% of those participating in formal training programs said that this contributed to their job satisfaction. An example of such a program is detailed on CISCO's Web site. It states the following policy: "CISCO Systems offers a Tuition Reimbursement Program that pays 100% of an employee's cost for tuition, books, and lab fees for courses taken at an accredited institution (up to an annual maximum of $7,500). To qualify, the employee must receive prior approval by completing a Tuition Reimbursement Approval Request form and must attain a grade of 'C' or better in the course taken."

We are supportive of government-wide efforts to remove restrictions on government payment for technical degrees and certifications. These approaches have been used in the private sector as proven techniques for recruitment and retention and can have similar effects in the federal government. One should not lose sight of the fact that employees we are training are doing a better job as a result of their increased knowledge. It is also likely that they are bringing these new

ideas and concepts to the workplace and that this is also helping their peers improve their own performance.

7.1.5.1 Degree Programs

The Department is not putting enough emphasis on career development and formal training. Only approximately 13% of its technical staff have IT-related college degrees and only about 40% have undergraduate (30%) or graduate (10%) degrees. This is lower than the general Treasury workforce (over 55% college or above).

Treasury IT staff hired since 1994 actually caused an overall decrement of 4.7% of formal education indexes from the staff it replaced. This contrasts highly unfavorably with private sector hiring practices. According to the ITAA report "Help Wanted: The IT Workforce Gap At the Dawn of a New Century," 95% of IT workers that private sector companies are hiring have either undergraduate (82%) or graduate (13%) degrees. It would behoove Treasury to gain authority to use industry-like IT degree tuition assistance programs and to encourage its bureaus to do so. Training toward degree programs can improve the technical performance of staff and can be an effective recruitment and retention tool in a tight labor market.

Federal policy with respect to supporting degree programs inhibits staff development. Section 4107(a) of Title 5 U.S.C. prohibits training for the purpose of obtaining an academic degree. This general restriction can be waived by use of 5 C.F.R. Section 410.308(b) (as amended in 1990) which allows an exception based on the determination that it will "aid in the recruitment or retention of employees in occupations in which the Government has or expects a shortage of qualified personnel, especially in occupations involving critical skills." The Department has limited authority to identify shortage applications and authorize the waiver of this provision.

Recommendation 7-2: The Department should explore the feasibility of declaring IT jobs shortage occupations. This would allow bureaus to offer degree-focused training to their IT technical and management personnel.

7.1.5.2 Certification

Certification is a common practice for technical skill areas in the IT workforce. Certifications range from very broad and comprehensive certifications (such as those for the Certified Computing Professional designation) to more product-specific certifications (such as Microsoft Certified Network Engineer). Although these designations do not guarantee competency, they do demonstrate the acquisition of a body of knowledge. An October 26, 1998, article in Information Week ("Certification Pays Off") quotes an independent study that found that Microsoft-certified professionals could handle 10 support requests per day per IS staff member, compared to seven per day for uncertified employees. Eighty-four percent of employees surveyed in this study said that Microsoft-certified employees were more productive in their area of certification.

As with degree programs, the federal personnel system restricts payment for certifications.

This restriction forbids payment or reimbursement for the cost of examinations, licenses, or certifications, even if required by the state where the federal employee works (Comp. Gen. B-235727). The agency may not pay for professional certificates required as a qualification for the employee's position (Comp. Gen. B-248955, July 24, 1992) or professional accreditation (46 Comp. Gen. 695, 1967). This practice is inconsistent with normal industry practice which looks upon the successful attainment of a technical certification as a key indicator of employee knowledge and performance. Also, despite opposing viewpoints on whether or not certifications demonstrate job performance competencies, it is nonetheless clear that certifications can improve performance and it is also clear that while employees are in these development programs they are much more likely to stay with the organizations that are developing them.

Recommendation 7-3: Support Federal CIO Council Education and Training Committee efforts to reduce barriers to the reimbursement of commercial IT certification costs.

7.2 Competency-Focused Development

The solution to our learning deficit requires more than greater spending. There is unlikely to ever be enough money to meet all of our IT training needs. We need to make sure that money allocated for staff development is spent in a balanced way and that it results in improved performance. Understanding our training deficit requires that we evaluate it in a different way. We believe that defining and assessing competencies is the best technique for achieving that objective.

The case for competency-directed development is a simple one: identify the skills needed for a job and invest in improving those skills. By defining the skills in sufficient detail, new training technologies can be applied. This, in turn, reduces cost and makes the training more job-related and more meaningful to the learner.

Competencies are defined as specific task-related areas of knowledge, skill, behavior, or attitude. These are the building blocks to job performance. By considering the entire scope of competencies needed for a job, creative and non-intuitive ideas can be allowed to invade development investment decisions.

7.2.1 IRS IT Competency Analysis

The Internal Revenue Service has done a great deal of useful research on the Computer Specialist job series. It established a competency framework for all computer specialists in the Internal Revenue Service. This framework can be generalized to the support the career development of IT staff across the Department. It highlights some important components of development.

First, it makes clear that technical competencies are only a part of the skills of computer personnel: they must also have "general" competencies in communication, teamwork, and customer service that affect the way they deal with their peers and with their customers. Computer systems projects have gotten so large and complex and so intertwined with business processes that these skills are a reasonable prerequisite to outstanding performance.

Second, there are baseline skills across the occupation that all computer specialists must possess. These include such competencies as understanding and being able to employ a life cycle management methodology that puts the worker's task into the larger context of technical and non technical tasks and identifies a discipline for defining, documenting and validating requirements.

Finally, technical specialties require more in-depth skills. In the IRS formulation, these include 11 role areas (such as applications programmer, systems support, systems engineering, etc.) and an additional 38 specialty areas within these roles (such as design, coding and unit testing specialties within the applications programmer role). Because IRS is a very large agency with a great deal of specialization, it is unlikely that this degree of job delineation would be useful for all agencies. Nevertheless, the competency approach allows one to break the job into smaller, more specific tasks and to establish learning objectives that can be addressed more incrementally. Breaking the job down into more bite-sized components has several important benefits:

- It can make improve the dialogue between managers and employees;
- It can focus on what is really important in training -- the communication of job-related skills;
- It can allow for more tailored, cost-effective training; and
- It can enhance the use of distance learning technologies that reduce training costs.

7.2.1.1 Improving the Dialogue Between Managers and Employees

IT managers are generally task-driven. This makes the occasional performance-based discussion even more loaded with a potential for conflict. Having discussions around the competency framework tends to defuse that environment. The IRS Curriculum Information System is so detailed that it allows considerable feedback over a large number of job components. It is unlikely that anyone performs all of these components well or none of them well. Rather, a mix of positive and negative feedback can be given. Even negative feedback is softened, because the context is on job performance improvement and actions management can take to improve skills. This can be a very productive dialogue.

7.2.1.2 The Communication of Job-Related Skills

The competency model helps managers and employees to bring training back to the context in which it is most meaningful: the communication of job-related skills. The most relevant training and the training most likely to be of interest is that training which is directly related to the actual job that a person is performing. By identifying the competencies associated with that job and tailoring the training to these competencies, training can be directly focused.

7.2.1.3 More Tailored, Cost-Effective Training

Traditional training programs have been formulated based upon the economies of classroom training. Until approximately three years ago, nearly all IRS IT training was conducted in a

classroom or lab environment. Because employees were being relocated for training, attempts were made to reduce travel costs as much as possible. The byproduct of these rational decisions was that nearly all training involved hotel and airport costs. Indeed, approximately 50% of the IRS training delivery funding is spent on travel. The actual composition of courses was affected by the travel reality. Courses were constructed to last 32-40 hours and lessons were added or deleted based more upon this economic imperative than on actual content needs. By defining jobs in terms of measurable competencies and defining these competencies in turn by detailed learning objectives, it is much easier to reduce the time in training. Sometimes a job aid or a work assignment can impart a skill more readily and more cost-effectively than a classroom course. By dissecting the component competencies in a job, these economies can be realized.

IRS's competency framework provides a basis for more constructive one-on-one discussions with management, better focused training and more effective development spending. Making this model fully effective for the entire Department or for use government-wide will require expanding it to cover broader levels of competencies and to establish career paths that are understandable to managers and employees.

Recommendation 7-4: We recommend that the Treasury CIO Council propose that the Federal CIO Council refine and simplify the IRS model so that IT developmental expenditures across government can be more targeted and more cost-effective.

7.2.1.4 Enhanced Use of Distance Learning Technologies

The IRS School of Information Technology is now using Correspondence Training, Computer-Based Training, Internet-delivered training, Interactive Video Teletraining (IVT) and other media to convey information and improve staff performance. These technologies allow for more "information shopping." Students can determine what they need to know and seek that specific information. Also, more tailored short duration training programs can be created to reach subsets of employees who need the training much more cost-effectively than with traditional classroom training. Numerous studies have shown that a change in media of delivery (from classroom to CBT or IVT, for instance) does not have an adverse impact on learning.

As part of the President's Federal Training Technology Initiative, the White House Office of Science and Technology Policy has been encouraging agencies to cooperate with one another to more cost effectively develop and deliver training. IRS's School of Information Technology is well poised to effect such an initiative within the Treasury Department. IRS has a nationwide interactive satellite teletraining network in operation. It has downlinks in most major U.S. cities where Treasury employees work. If viewed as a corporate resource, this network could allow highly cost-effective and targeted training to occur. IRS is also using the Treasury Intranet to disseminate Computer Based Training to a large number of employees. In three years, this training avenue has gone from zero to 13,000 training incidences each year.

Recommendation 7-5: We recommend more use of distance learning technologies that shorten the gap between knowledge acquisition and performance and reduce the cost of training delivery.

Technical support needs to be provided by the Department and each of the bureaus so that satellite and Web-based training transmissions can be adequately received and used by employees in every bureau.

CHAPTER 8 – DEVELOPING WORKFORCE STRATEGIES FOCUSED ON RECRUITMENT AND RETENTION

8.1 Workforce Analysis Studies

Two analytical workforce profiles were conducted on behalf of the IT Workforce Improvement Program in mid-1998. One analyzed the demographics of the current Treasury IT workforce. The other analyzed the accessions and separations from this workforce. The results suggest that some new strategies are needed to keep our IT workforce vital over the next several years. The combination of the baby boom, the growth of the federal government in the sixties and seventies and its low growth and net decline over the last few years (including contracting out and downsizing initiatives) have resulted in a relatively static workforce profile which is moving a large cohort group toward retirement eligibility without recruiting replacements or providing those replacements with adequate development opportunities to assume their new responsibilities.

8.1.1 Demographic Profile

An extensive series of statistical reports were run for the ITWIP office on March 14, 1998. These reports utilized data from the Treasury Integrated Management Information System (TIMIS) and were supported by analysts in that office. These reports covered all Treasury bureaus and the Departmental office. The reports focused on the largest components of the technical IT workforce: GS-334 (Computer Specialists); GS-1550 (Computer Scientists); and GS-391 (Communications Specialists). Of the Department's 9,300 IT employees, 6,103 are in those categories. The remaining 3,000 or so employees that were not included in the reports are in managerial or analytical series (e.g., GS-301, GS-340, GS-343) or administrative series (clerical and secretarial) that are not easily distinguishable from the non-IT workforce. By using the categories chosen, we captured about two thirds of the total IT workforce and, certainly, a far higher percentage of the IT technical staff workforce. This structure is largely consistent with Office of Personnel Management categorization which puts GS-334, GS-391, GS-1550 and GS-854 (Computer Engineering Series) in the IT professional ranks (Office of Personnel Management, Recruiting and Retaining Information Technology Professionals, March 1998).

The TIMIS reports covered retirement eligibility in each series in each bureau by grade level from 1998 to 2004. They also provided data on education, age, gender, length of service, supervisory status, and academic area of study. On June 3, 1998, the TIMIS office provided us with its own analysis and interpretation of results. Findings from this report are used throughout this Chapter. A couple of significant findings are highlighted below.

The Treasury IT workforce has a significant female population. Approximately 43% of the technical workforce is female. This is significantly higher than in the private sector.

The most significant finding from the reports is the extraordinarily high average age and length of service of Treasury IT employees. The average age of Treasury's IT staff is 44 years of age. There are currently more technical employees over 55 years of age than there are under age 30. Since 1993, the only categories of technical workers that have shown a net increase are those for workers ages 45 and over. The GS 7-11 grade levels which should be the training ground for young employees on career ladders toward advancement has an average age of over 40 years old. This demographic profile means that the workforce is stable and experienced. It puts the Treasury Department in a good position to deal with a challenge like the Year 2000 project where familiarity with existing systems is at a premium. However, it is of greater concern when one looks beyond the Year 2000 toward an agency which is increasingly reliant on technology and on increasing the introduction of new technologies into its operation. Many skilled and experienced employees are nearing retirement age.

8.1.2 Study of Accessions and Separations

The IT Skills Enhancement Subcommittee initiated a separate follow-on effort using the TIMIS data to identify and address critical recruitment and retention issues pertaining to IT professionals within the Department and to determine the best solutions to rectify these issues. This study was conducted by members of the Subcommittee. It included members from U.S. Secret Service, the Comptroller of the Currency and the Department's Assistant Secretary for Human Resources organization. A report was submitted on July 16, 1998. This analysis drew upon these same TIMIS data, but focused more specifically on accessions and separations from 1993 through 1997.

The study found that Treasury's IT staff turnover rate from 1993 to 1997 has been in the 6% to 9% range. By national standards, Treasury Department's IT staff turnover rate is very low. According to the Gartner Group (as quoted in Inside Technology Training, June 1998), the turnover rate for IT professionals now stands between 12% and 20%.

Treasury's experience is more telling when one looks at where turnover is occurring. Resignation rates have increased in every age category since 1993, but they have been over 10% for the youngest workers (workers below age 25 had 10% or greater rates in 1994, 1996 and 1997 and workers ages 25 to 30 had greater than a 10% resignation rate in 1997). Much recruitment to fill these vacancies has been from status employees in other agencies or from sister bureaus undergoing downsizing actions. Whereas in FY 1993 two out of every three IT vacancies were filled by private sector hires, in FY 1997 that ratio had shrunk to one in eight. The result is that in recent years technical employees who have been hired are, on average, older and have a 4.7% lower formal education level than those who have left the Department.

8.1.3 Summary

Although Treasury's technical workforce is highly experienced and has been highly stable, this may well change dramatically in the next few years as a large cohort group in the workforce moves toward retirement eligibility. By the year 2004, 22% of Treasury's IT workers will be eligible for immediate retirement and another 27% will be eligible for discontinued service

retirement. Holding onto these workers and attracting new workers in a tight IT labor market will be a significant challenge.

Recognizing the need to give bureaus great flexibility in using existing personnel authorities to attack problems with recruitment and retention of IT professionals, the Department's Deputy Assistant Secretaries for Human Resources and Information Systems issued a joint memorandum on July 7, 1998. This memorandum, "Using Personnel and Human Resources Flexibilities to Recruit and Retain Critical Technical Talent," requested that bureau CIOs and Bureau Personnel Officers (BPOs) work together to address recruitment and retention concerns. Subsequently, the Deputy Assistant Secretary for Human Resources delegated the application of most of these flexibilities to BPOs.

8.2 Recruiting a Highly Skilled Technical Workforce

The recruitment market for IT skills is highly competitive. According to the Corporate Advisory Board's Working Council for CIOs (*Far from the Crowd: Strategies for Attracting IT Talent in a Perfecting Labor Market*, 1998), companies increased their IT staff by an average of 17% between 1996 and 1998 and, despite this increased staff, still had more open positions (8.9%) in 1998 than in 1996 (6.3%). As another index of this tight labor market, turnover rates among IT employees in the Virginia/DC area increased from 12.6% to 13.2%. Average entry level programmer salaries rose nationally from $41,000 in 1995 to $49,500 in 1997. Seventy-five per cent of companies surveyed were using "off-cycle bonuses" to reward performance.

Firms are also turning to non traditional strategies to recruit IT employees. In response to a Coopers and Lybrand, LLP query of 441 U.S. businesses, 54% of the companies reported problems in recruiting experienced professionals and technicians and 43% reported problems finding skilled IT personnel. These were the top two shortage categories identified. In response to this problem, 30% of companies were providing rewards for employee referrals, 25% are responding with more flexible work hours, 21% are establishing new career-development programs and 20% are increasing on-campus recruiting for new graduates ("The Hiring Line," CIO Magazine, August 1, 1998).

The skills needed to supplement and eventually replace our current IT workforce can come from a variety of sources, including short-term temporary recruitment, transfers from non technical occupations, hiring at the entry level and hiring experienced private sector employees.

8.2.1 Short-Term Temporary Recruitment

The Office of the Comptroller of the Currency is working with a firm called The Consortium to get temporary professional support on critical projects. This is a common practice in the private sector, but is less common in government. It allows for a private company to rapidly recruit and compensate personnel while the government is pursuing its formal merit system advertising and internal promotion procedures (which can be lengthy). This approach would seem to have broad potential and value for other bureaus assuming that legally mandated personnel rules and

processes are appropriately followed. It is a stop-gap, but potentially significant strategy to fill voids in key personnel expertise.

Recommendation 8-1: Explore the feasibility of establishing a Department-wide program for temporary appointments or short-term recruitment to support critical vacancies.

8.2.2 Transfers from Non Technical Occupations

As mentioned in Chapter 2, only about 25% of those in computer-related occupations nationally have computer science degrees. In the Department, that figure is only about 14%. It stands to reason that a great deal of talent exists in other disciplines. One place to look is among current non-IT employees with extensive business knowledge. Indeed, internal recruitment on an informal basis has been a highly productive source of IT talent. Between 1994 and 1997, 74.7% of employees entering the Treasury's IT series came from other non-IT job series within the Treasury Department. Treasury needs to ensure that when employees make this shift they are given the support they need to be successful.

Hiring criteria for non-IT staff should include general competencies (communication, teamwork, customer service orientation, etc.), aptitude for technical jobs and motivation. Cincinnati Bell Information Systems (CBIS) is an example of an organization that has taken this approach (Inside Technology Training, November, 1997). It has separated its training classes into two types: experienced programmers and non-programmers. This latter group takes an 11-week class that starts with computer terms and mainframe concepts. It moves on to BASIC and COBOL language programming. It then spends three weeks working on a simulated project and assessing its performance. These sessions are facilitated by qualified technical trainers. People are selected for these programs based on technical aptitude, communication skills, and the ability to work well in teams.

The Internal Revenue Service has conducted extensive research on IT competencies. Based on this work, its School of Information Technology can build and employ competency assessment instruments which could be used as part of the recruiting process. These could also be used to help identify staff members currently on board who could be expected to successfully make the transition from their business function to an IT position.

Recommendation 8-2: Pilot an internal IT recruitment program which selects employees based upon their competencies and aptitudes. Establish programs to enable non-IT employees to make the transition to the IT career field.

8.2.3 Recruiting at the Entry Level

As noted in Chapter 2, recruiting for entry level talent in the current hot IT skills job market will be extremely difficult for the federal government and the Department. However, the Department should consider some corporate innovations in its effort to recruit talent. These include "corporate branding" and shortening the recruiting cycle.

Also, the Department can make entry into the Department more attractive for potential employees by packaging job variety, educational opportunities and challenging assignments in formal development programs. Traditional intern and co-op programs are one method for introducing new employees to the Department. We also recommend that the Department consider a formal "IT Professionals" program to attract talented recent graduates.

8.2.3.1 "Branding" the Treasury Department

A common approach among industry leaders is to establish a presence (through instructing or funding scholarships or programs) at universities so that their company can be known in its local community and so that it can identify good job candidates. Corporate relationships with high schools also often have this joint purpose. They benefit schools by linking classroom instruction with the skills needed in the workplace. They also identify the company as a potential future employer.

Part of the challenge of recruiting in a hot labor market is just being noticed. This sort of indirect advertising and recruiting is relatively costly in the short term, but can reap major long-term benefits as personal associations and linkages are established. Such commitments can have the dual function of supporting community development efforts and establishing new recruiting channels for IT staff. The Internet offers the Department the opportunity for better worldwide recognition of the variety and criticality of its enterprises; this is a channel of communication that the Department needs to more aggressively exploit.

Recommendation 8-3: Explore the possibility of raising recognition and understanding of Department missions by establishing long-term professional and recruitment relationships with universities and local high schools and their technology centers. Explore ways to use the Internet to promote the corporate Treasury identity and to demonstrate the variety of important and challenging efforts in which Treasury is engaged.

8.2.3.2 Shortening the Recruiting Cycle

Although "public" job advertisement should be an advantage for the government, it often is done in an arcane and formulistic method which means little to those outside government. Announcements are often many pages and require lengthy essays on experience. In a labor market in which applicants can paste a one-page resume from their computer into a Web page and apply for a job, this process seems cumbersome and rigid. Even finding out about the existence of such "open" announcements can be extremely difficult to the uninitiated. The Department needs to look to more aggressive outreach techniques such as Internet advertising (at least on its own Web site) if it is to compete in this marketplace.

Private companies are doing everything they can to shorten the recruiting cycle. As an example, at a recent conference, the personnel director for Computer Sciences Corporation described its initiative of funneling resumes directly to project managers after a purely rudimentary personnel office review so that CSC would not lose out to other companies that were more aggressive in

their hiring. He also noted that employee referrals (for which the referring employee receives a cash bonus) are now CSC's number one recruitment tool.

Recommendation 8-4: Review current employment advertisement strategies and develop more dynamic approaches so that Treasury IT job announcements are more targeted and better noticed by potential job applicants surfing the Internet for opportunities.

8.2.3.3 Recruiting Co-ops and Interns

A number of bureau CIOs indicated that they have had historic success in using the Co-op Program and intern programs to bring young people into their organizations. Such programs are a relatively low cost option, can be done within current authorities and can be extremely attractive to high school and college students seeking part-time employment and work experience that will make them more attractive to future employers.

Experience and understanding gained through these programs has often led to permanent positions. In fact some of the people entering in this fashion have become critical long term members of the IT staff.

8.2.3.4 Recruiting Recent Graduates

A formal program for IT employees entering the workforce as new college graduates could be an important technique for attracting young talent into the workforce. Clearly, without some formal program, this is a group which will continue to be difficult to attract. Nevertheless, it is the core of our current workforce and it is essential that the Department begin to address rebuilding this core. General Electric (GE) has a Information Management Leadership Program (IMLP) ("Helping Build Careers," INFOWORLD, July 13, 1998) which could serve as a model for such a program. GE recruits employees from college and enrolls them in courses to develop their technical skills, leadership abilities and business acumen. It also rotates them through a series of assignments with different technologies. This program can take about three years. After that, employees who meet expectations are assigned to various business units where they assume leadership positions.

In Treasury, such a program could help the Department attract recent college graduates who would otherwise seek jobs with higher compensation. Also, if successful, the program would create a group of highly skilled IT professionals with a broad understanding of Treasury IT operations and interrelationships. The HR and CIO organizations have concurred on establishing the framework for such a development program. Since current recruitment needs are modest across the Department but are likely to increase significantly in the future, it would be best to begin a program of this type at the Department level and then migrate program participants to individual bureaus, perhaps giving them assignment to multiple bureaus on a rotating basis and allowing to them to pick their target bureaus. In addition to capitalizing on funding efficiencies, this could have the ancillary benefit of giving participants a more "corporate view" of the Treasury Department. This could have long term benefits for the Department as it pursues cooperative IT initiatives.

Recommendation 8-5: Create a Treasury Information Professionals Program aimed at attracting, rapidly developing and retaining recent college graduates. Manage this at a Departmental level and then reassign program graduates to the bureaus of the Department.

8.2.4 Recruiting Experienced Private Sector Employees

One group of workers whom the government can attract is older workers. When InfoWorld surveyed its readers ("Complexities of Age Bias," July 20, 1998), government was not among the top two choices for IT job hunters ages 18-39. However, it was a second choice for workers 40-44 and a first choice for workers over 45. If the government focuses on skills and competencies, it may gain the opportunity to employ some first rate employees who are being overlooked by the private sector because of biases about the perceived technical currency or industry of older workers. The initiative identified in Recommendation 8-4 could also target these applicants.

8.3 Retaining an Experienced and Stable IT Workforce

Recruiting can be a futile and expensive undertaking unless working conditions that are attractive to both current employees and new recruits are in place. The Department has taken some initial steps (mostly focused on Year 2000 staff) to improve retention. Industry experiences suggests that a broader perspective must be undertaken to improve the working environment. It is likely that any such programs would be best addressed within the context of each bureau; this section contains some suggested policies that bureaus should consider.

8.3.1 Departmental Efforts

In addition to making technical managers more aware of existing recruitment and retention flexibilities available from the Office of Personnel Management, the Department has taken several actions. It has delegated much of its authority to approve recruitment and retention incentives, it has worked with OPM to acquire authority to hire up to 240 Year 2000 programmers under a special program that allows these employees to collect their pensions and retain their full salaries with no offset.

The bureaus have taken advantage of several of these initiatives (IRS has been the most aggressive), but other bureaus do not appear to have used all of the flexibility open to them. In Fiscal Year 1998, 935 retention bonuses were given to employees in technical series (921 in IRS) and only seven Year 2000 annuity exemptions were granted.

8.3.2 Industry Experience

Retention involves a complex relationship between the employer and the employee. It is affected by the work environment and personal relationships and by the employer-employee compensation package (including salary, bonuses, stock options and benefits). In the IT world, training is considered a major component of this package. According to Hay Group research (Rick Poppell, quoted in Inside Technology Training, June 1998), skills training ranks number one in importance for IT retention while "corporate culture" ranks second and compensation ranks third.

Information Week (November 3, 1997, "Short Supply") contacted 400 senior IS executives and

asked for their strategies for attracting and retaining programmers. Over 80% identified training (the first choice). Other strategies included various compensation strategies (401k match - over 70%, 2nd choice; Stock Purchase Plan - over 30%, 6th choice and signing bonus - also, over 30%, 7th choice). Other approaches were flexible hours (70%, 3rd choice), better equipment (over 60%, 4th choice) and job titles (approximately 50%, 4th choice).

Another way to look at retention is to look at what benefits and strategies most attract employees. A 1998 INFOWORLD survey of its readership (published June 15, 1998) noted the following: "95% of those who reported receiving formal training said this contributes to their job satisfaction;" 90% of those who got to periodically change assignments said this contributes to their job satisfaction;" and "80%..(of those working in companies that offer a defined career path)... said this contributes to their job satisfaction."

8.3.3 Departmental Retention Strategies

Using authorities available to them or working together through the Treasury CIO Council, bureaus can address retention through a number of strategies. Many of these could be unique to their culture and structure. Among the areas that have been demonstrated to attract IT professionals are: compensation; work hours/commuting; work relationships; opportunities for challenging assignments; and opportunities to improve skills; and opportunities to serve the public.

8.3.3.1 Compensation

Although not generally identified as the primary reason for changing jobs, compensation obviously makes a difference. A private sector example (Managing IT turnover, INFOWORLD, July 6, 1998) is American Century Investments, a mutual fund in Kansas City, Missouri. Experiencing 15% turnover and projecting 24% turnover rates among its IT staff, American Century established performance bonuses of 10-25% and retention bonuses of 18-30%. With these opportunities in place, turnover dropped to 1.4%.

The Treasury components on separate pay scales above the General Schedule (the Comptroller of the Currency and the Office of Thrift Supervision) reported to us in CIO interviews that they have been able to find well qualified applicants for most of their technical vacancies. Other Washington, DC-based Treasury components expressed considerably more concern about their ability to compete for technical talent in the Washington, DC, area. Our proposal (Recommendation 6-1) that OPM review the classification standards for the computer specialist occupation could have a positive impact in the government's ability to properly compensate IT employees with critical skills.

The Internal Revenue Service reports that since it initiated its retention bonuses for over 900 computer programmers in the Washington, DC, area, turnover rates among that group have stabilized at 4%. Prior to the bonuses and a series of other management announcements including a no-layoff policy and increased funding for training, the attrition rate had been 8%. Although this rate is not high by industry standards, it was challenging to the IRS because of its critical

Year 2000 effort and its reliance on hard-to-replace Assembly language programmers.

One area in which federal retention bonus authority differs significantly from private industry is the use of targeted bonuses. Bonuses such as those offered by the IRS are payable bi-weekly until the bureau determines that a critical employee is no longer in danger of leaving. In private industry, it is more common for these bonuses to be payable at the completion of a specific project phase or date (for instance, paying Year 2000 staff in March 2000 after they have worked the agreed term). Having the flexibility to pay retention bonuses on this basis might yield better opportunities for rewarding the behavior that is sought.

Recommendation 8-6: Explore with OPM the possibility of providing agencies with the flexibility to pay retention bonuses based on a fixed term or project stage completion.

8.3.3.2 Work Hours/Commuting

One response that can be effective in retention is allowing employees the flexibility to tailor their work schedules. Ernst & Young has lost many talented people in their thirties because of their desire to change their work commitment or respond to personal challenges. After surveying employees, it came to the conclusion that it could keep many employees by providing "a flexible work arrangement program, which allows employees to choose the hours that fit their schedules. This includes the option of working from home when they are not visiting a client site" (InfoWorld, September 28, 1998). Ernst & Young (as a partnership) could not compete with stock option offers of its competitions and chose this as a way to differentiate itself.

Likewise, the Treasury Department needs to look at the flexibilities available to it rather than to bemoan the fact that it cannot offer the lucrative benefit packages which are often available to IT employees in the private sector. Most Treasury bureaus have some form of flexible work hours. Bureaus need to examine to what degree they are offering these program to their IT employees. Such programs (coupled with child care, health centers and other amenities) can be important criteria to technical employees choosing their workplace.

8.3.3.3 Work Relationships

One of the most important and most elusive component of working conditions is satisfaction with peers and supervisors. This is also an area that is highly work-group dependent. However, the Department can adopt policies and encourage actions that improve the day-to-day environment of its IT workers.

The most important factor in this mix is the behavior and support provided by the IT supervisor. As noted in Chapter 6, Treasury's CIOs see supervisory training and performance as among their highest priorities. Providing more training for supervisors and listening and responding to their concerns are likely to be positive strategies. Bureaus may also want to experiment with management tools such as more frequent appraisals and pay adjustments to increase dialogue and improve feedback between managers and employees.

8.3.3.4 Opportunities for Challenging Assignments

Among IT workers, the opportunity to work on challenging assignments with new technology is considered a major factor in their retention. The Department has an excellent array of challenging work. This may be an area where the Treasury CIO Council could give workers an opportunity to move from one bureau to another to try their hand at such projects. This would provide several benefits. First, it would allow for technology transfusion from one bureau to another so that each bureau gains from the experience of its sister bureaus. Second, it would allow workers to shift from routine maintenance work to new development with new tools; their value to their home bureau would be improved. Finally, it could offer bureaus some relief from budget pressures when major technology initiatives are undertaken. This could be considered a developmental opportunity for those working across bureaus.

The Treasury-wide PeopleSoft human resources enterprise-wide implementation offers an example of how this concept could work. Employees from the Mint and the Bureau of Alcohol, Tobacco and Firearms could export their knowledge by moving from their internal efforts to work on development projects in other bureaus. Conversely, bureaus not yet ready to fund and implement their own projects could take staff off their planning efforts and give them some real-world development experience before they come back to support their own bureaus.

8.3.3.5 *Opportunities to Improve Skills*

Organized training programs or long-term skill development strategies can significantly reduce turnover. As an example, Owens Corning undertook a major redesign of 210 of its legacy systems in 1995. The combination of retention programs and retraining efforts held these workers on the job. Over the three year period, only 8% of the 160 employees involved left (Inside Technology Training, June 1998). Once the program was completed, however, turnover began to rise significantly.

Nations Bank (undergoing a major retraining on client/server technology) estimates that it is spending $8-9,000 per person on employees involved in its program. These investments hold people on the payroll for the term of the program, but the Inside Technology article (“And Away They Go: Re-skilling the IT staff often leads them straight to other job offers”) points out that new skills raise competency and the expectation of compensation for the new skills. When these expectations are not met and when employees do not get the assignments and opportunities that they have trained for, they often leave their companies. They have highly valuable and highly transportable skills.

Using certification or formal degree programs as a lure (see Chapter 7), the Department can offer programs that simultaneously improve its employees’ IT skills and improve the its retention these workers. Such programs need not be limited to only technical skills. It is important to develop better business understanding among IT employees. The Department should consider training its IT employees in business skills where this can enhance their ability to understand and deal effectively with their customers in the Department.

8.3.3.6 Opportunities to Serve the Public

When analyzing the pros and cons of various benefits and the attractions of various recruiting and retention strategies, it is easy to overlook the real attraction of government. Government employment is public service. Many IT workers are interested in the result of their work and are not focused exclusively on compensation like profit sharing and stock options. To idealistic young, middle aged and experienced workers, government offers an opportunity to contribute to a cause greater than and more lasting than themselves or their company's profits. This element of our employment should be emphasized in any programs that the Department undertakes for recruiting or retaining IT personnel.

8. 4 Alternatives to Recruitment and Retention

The challenges of maintaining, rewarding and continuously challenging and continuously training an IT staff can seem so daunting as to make one question whether or not it is worth the effort. A fundamental baseline decision in every Treasury bureau and at the Department level is a basic determination on when to buy skills (e.g., contract support) and when to build these skills internally. An infinite variety of approaches are available, ranging from 100% outsourcing of data processing support to 100% internally staffed IT support. In the general case (and in all of the Treasury bureaus to date), organizations try to find an appropriate mix of skills to meet their needs. This should, by its nature, be bound to broader mission and policy issues and is beyond the scope of this report. However, since it is a key component of an IT staffing strategy, it will be discussed briefly.

8.4.1 Outsourcing

In general , "Outsourcing" refers to the contracting-out of major component activities to commercial data processing support entities. Outsourcing of data centers, for instance has long been a commercial practice and can relieve organizations that do not have strong data processing competencies of routine, but complex and expensive computer operations functions. More recently, however, outsourcing has come to refer to more global strategies for the movement of all data processing operations (perhaps excluding strategic planning and architecture) to commercial entities. In Great Britain, for instance, Inland Revenue and the Ministry of Defense have moved into large, long-term contracts with Electronic Data Systems (EDS) to run the totality of their data processing operations. In both cases only relatively small project oversight offices exist in the home institution. Extensive contract provisions attempt to ensure that the government and the contractor form a true partnership where costs and benefits are fairly spread among them and the contractor identifies with the mission and performance requirements of the government.

At their best, such arrangements can lower costs while increasing responsiveness and flexibility. However, such approaches are not without challenges. Some companies that have outsourced most IT operations ("Can Turnover be a Good Thing," INFOWORLD, July 6, 1998) aren't sure that they would make the same decision after experiencing this environment. Finding and retaining the right type of staff and rewarding and developing them when the variety of data processing jobs has been reduced in an organization is a difficult challenge. Also, a great deal of business knowledge often moves with IT operations personnel to the outsourcing company. Continuing a

client-supplier relationship and eventually divorcing itself from a supplier company and competing the contract or bringing the work back in-house can be traumatic experiences. To date, few organizations that have outsourced on a significant scale have attempted either of these actions. The Meta Group reports that among Global 2000 companies, the majority are unhappy with their relationships with outsourcers – "The main reasons: inadequate vendor services, mismanaged deals, and unreasonable expectations." (Source: "New environment will require new skills for IT processionals in the future", InfoWorld, November 16, 1998). Although outsourcing is an alternative that transfers recruitment and retention challenges to the contractor, it should not be considered a panacea for recruitment and retention concerns.

8.4.2 Establishing Support Contracts

Much more common than outsourcing is getting contractor support for IT initiatives. In FY 1998, for instance, the Department spent approximately $670 million on hardware, software and services and spent almost as much on contractor staff ($545 million) as on its own IT personnel ($606 million). IRS's new Prime Contract continues this trend of heavy reliance on contractor support. However, all Treasury bureaus still have significant internal IT staff organizations and these staffs are becoming increasingly critical to mission delivery.

CHAPTER 9 – CONCLUSION

If the Treasury Department is to prosper, innovate and lead government with advanced IT solutions, it must have a workforce that is up to the challenge. Although this paper has focused on the very real challenges that face the Department now, it is also important to look ahead and consider what we should be building toward. Otherwise, we run the risk of solving today's problems while missing tomorrow's opportunities.

A number of trends are apparent and should be considered in planning for the future. These include the following: 1) a transition to a new type of IT professional; and 2) an increased use of IT in day-to-day Department program operations.

9.1 Future Directions in IT Skills

The Treasury CIO core competencies are an effective indicator of the growing breadth of knowledge and ability that is required of the IT professional. Not only must these senior managers be effective managers of people and processes, they must also have an understanding of an increasingly complex and diverse array of technical tools and they must understand organization, policy and program needs. They must become true partners with the program leaders in the Department so that they can help identify and deliver breakthrough technology solutions to challenging problems.

IT managers at the mid-level must also have an increasing knowledge of the programs with which they work. Also, nearly all must be project managers, in fact, if not in title. The technical solutions are so diverse that no one can hope to have the expertise to bring all of the necessary tools to bear. Every Treasury bureau is deeply dependent on coordination and integration of efforts of program, IT and contractor staff to carry out almost any effort, no matter how mundane.

The work of every IT professional has been changed by the technology that they employ. It is increasingly important to build systems and solutions at a faster pace. This means that the IT analyst must be a business analyst who can bridge the gap between specialty contract support and program officials. This puts a much higher demand on critical skills such as teamwork, and oral and written communication skills.

Finally, program managers and end users who have not been traditionally considered IT personnel will have to have an increasing array of IT skills to perform their day to day work. Many systems are being delivered to a workforce that is not schooled in IT. To do their jobs, this must change.

We are moving from a world in which everyone's role was clear and one did not need to know too much about the details, to a world in which everyone's role overlaps and work can only be done through teamwork and collaboration. Barriers to communication and stereotypes of capability need to be broken down so that IT and contractor and program officials can work

together on complex enterprises on which none alone could be successful. Our ability to be successful in this new environment will depend upon the degree to which old barriers can be broken down and old perspectives can be changed. This could be the most productive and exciting time to be working in the Treasury Department. Barriers between our organization and the people we serve are being broken down by technology. We need to develop our staff to take advantage of the revolutionary opportunities that such a change presents.

9.2 Establishing a CIO/HR Task Force to Address the IT Skills Challenge

The Treasury Department is approaching a crisis in information technology skills. Like the Year 2000 challenge, this crisis is belied by the seeming tranquility and stability of day-to-day operations by the current workforce. However, this highly experienced workforce is moving in great numbers toward retirement eligibility. It is also a workforce which must be retrained to take on new technologies and new challenges.

Unfortunately, recruiting and developing new IT talent is not likely to be easy. Treasury's staff re-tooling must take place at a time where there is a national shortage of IT personnel and the marketplace for these talents is highly competitive. For the Department to be successful in its fundamental missions, it must tackle and overcome these recruitment obstacles. A coordinated and comprehensive effort must be undertaken now.

Recommendation 9-1: Based on the recommendations approved in this report, charge the Information Technology Workforce Improvement Program with the development of a comprehensive plan of action within 90 days. This plan of action will involve the development of a comprehensive budget and staffing plan and will be jointly approved by the Treasury Chief Information Officer and Human Resources Advisory Councils.